



Universidad de Valladolid

FACULTAD DE EDUCACIÓN DE SORIA

Grado en Educación Primaria

TRABAJO FIN DE GRADO

**TEACHING NATURAL SCIENCE THROUGH
MONTESSORI METHOD IN PRIMARY
EDUCATION**

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*Agradezco la labor de todos los profesionales
que me han guiado en esta andadura. Gracias por
mostrarme lo importante y bella que es esta profesión.
A mi familia y amigos por confiar cada segundo en mí.
“Con constancia y esfuerzo conseguirás tus sueños”.*

ABSTRACT

This final degree report pretends to investigate and analyze what is CLIL (Content and language integrated learning) and what is Montessori Method in order to design a primary education Natural Science didactic proposal joining and combining these two concepts (CLIL and Montessori Method).

The body part of this report is divided in two different but related parts. The first one exposes the theoretical bases of the concepts mention above. Moreover, in the second part and following these theoretical bases, I provide a Natural Science didactic proposal named “The plants”, designed to be developed with pupils of 1st grade of primary education.

The report concludes with some reflections about its elaboration as well as I mention and consider its scope and possible limitations.

Key words: CLIL, Montessori’s Method, Natural Science, didactic proposal, primary education.

RESUMEN

Este Trabajo Fin de Grado pretende investigar y analizar que es CLIL (Aprendizaje Integrado de Contenidos y Lengua Extranjera) así como en que consiste el Método Montessori, con el fin de diseñar una propuesta didáctica de ciencias naturales en la educación primaria basada en estas dos metodologías.

El cuerpo de trabajo está dividido en dos partes diferenciadas pero relacionadas entre sí. En la primera se exponen las bases teóricas de los dos conceptos mencionados. En la segunda parte y teniendo en cuenta estas bases teóricas, adjunto una propuesta didáctica de ciencias naturales “Las plantas”, diseñada para llevar a cabo con alumnos de 1º de primaria.

El trabajo concluye con varias reflexiones acerca de su elaboración, así como su alcance y posibles limitaciones.

Palabras clave: CLIL, Método Montessori, Ciencias Naturales, propuesta didáctica, educación primaria.

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1. INTRODUCTION

The present report pretends to analyze what is CLIL and what is Montessori's method, pointing out its development in Primary Education through the teaching of Natural Science. The analysis of these terms is made to achieve the main aim: to design a Natural Science didactic proposal joining and working with these two concepts: CLIL and Montessori's method.

It is known nowadays the increasing number of schools that are implementing in their curricula The Content and Language Integrated Learning program as a pedagogical approach. As Navés (2011, p.2) defines, "this alludes to situations in which part of a study program is taught in a foreign language, with the dual objective of learning the content of the discipline while learning the language at the same time". This way of learning contents through a foreign language is becoming really popular in our country. In my recent training period as an English primary education trainee teacher, I have experienced how more and more parents want their pupils to learn with this type of approach. So my questions are: What is really CLIL? What are its principles, bases, characteristics and potentials? How can I teach a Natural Science lesson in English?

On the other hand, Montessori's method has always drawn my attention because of the importance given to the multisensory and autonomous learning of the child so as the aspects that differ from the traditional teaching and I find it interesting. For this reason and as I want to design a didactic proposal with this method, I have to investigate in order to answer the following questions: Who founded this methodology? What are its principles and characteristics? What is the role of the primary students according to this methodology and how do they work with it? How does this method develop Natural Science lessons?

Once those questions have been investigated, studied and answered, the final work is to relate the main concepts mentioned before and design a didactic proposal that I can carry it out in my future work as a primary education teacher. Moreover and to close this report I add some conclusions.

2. AIMS

The aims that I want to achieve with this report are the following:

- To investigate and know what is CLIL, its aims, principles, characteristics and potentials.
- To analyze how Natural Science lessons are taught within CLIL.
- To investigate Montessori's method and examine its principles and characteristics.
- To know and analyze how does this method develop Natural Science.
- To design a Primary education Natural Science didactic proposal joining these two concepts: CLIL and Montessori Method.

3. RATIONALE

The title and content of this report is directly related with the Primary Education degree I have studied during these last four years, it is directly related with its subjects and competences.

The first aspect to point out is that this report is based on CLIL approach as the title says "**Teaching Natural science through Montessori Method in Primary Education**". This document is conducted to design a didactic unit to work Natural Science in English language with pupils of primary education. The didactic proposal has been planned taking into account the characteristics of primary education students, their learning processes and the developments of their personalities. Besides, its design has been based on the criteria required (and learned during the degree) to plan a didactic unit. In this way we can relate these aspects with the competence students of this degree have to achieve: Being able to recognize, plan, implement and evaluate teaching and learning practices.

Moreover and as I have said in the first paragraph, this report is related with different subjects and its competences learnt during the degree. One of them is the subject "**Curriculum**" where we learnt, among other things, different methodologies as

the Montessori's method (analyzed, studied and implemented in this report). With this point I keep the following competence: Learn the fundamentals and general principles of the primary stage, and design and evaluate different projects and innovations, mastering active methodological strategies and approaches using diversity of resources.

Furthermore, during the degree we have also studied **“Experimental Science”** and **“Teaching experimental science”**. This report is also related with them, as Natural Science is included in Experimental Science. In these two subjects we have learnt Natural Science contents and how to teach them in the classroom. For this reason my Natural Science didactic proposal is related with the following competence: transform the scientific knowledge of reference linked to experimental science in “know to teach” through appropriate processes of didactic. Moreover, verify at all times the progress of the students and the process of teaching and learning through the design and implementation of assessment situations both formative and summative.

To conclude with this section we can also relate this report with the subject **“Procedures for teaching English as a foreign language”**. In this subject we learnt how to teach English, how to design an English lesson planning and which are the strategies and resources for it. Moreover, we made an analysis about Content and Language Integrated Learning (CLIL). This report develops and promotes the competence included in this subject: Use the foreign language as a tool for communication and understanding of the real world while developing the skills necessary for the interpretation and creation of texts.

4. THEORETICAL FRAMEWORK

The present section is divided into two different but related points, as I'm going to work with both to design my didactic proposal. First of all, before beginning the aforementioned it is necessary to know and analyze the theory in which these two proposals (CLIL and Montessori's method) are based.

On the one hand I am going to expose what is CLIL, its definition, aims (including primary education), principles, characteristics and potentials. Furthermore and once I analyze these aspects, I conclude this point relating CLIL with science lessons, giving an example of the teaching of natural science through CLIL.

On the other hand and giving the same importance to it, I present Montessori's method. I will talk about who founded this methodology, why and how it evolved. After that, I analyze its main principles and characteristics in order to know the bases of this methodology. Besides I point out the characteristics of pupils of primary education according to this method. In addition and to finish with this section, I expose an example of how Montessori's method works Natural Science in one of its schools.

4.1 CLIL

4.1.1 What is CLIL?

The initials of CLIL mean Content and Language Integrated Learning. As Navès (2011, p.2) says in its article "this alludes to situations in which part of a study program is taught in a foreign language, with the dual objective of learning the content of the discipline while learning the language at the same time"

According to Marsh (2002, p.15), CLIL is a general term which refers to "any dual-focused content in which an additional language, thus not usually the first foreign language of the learners involved, is used as a medium in the teaching and learning of non-language content".

Furthermore, Arnau (2001) exposes that this teaching of foreign languages through content is a pedagogical approach that proposes the integration of language teaching with the contents of the curriculum (Mathematics, Literature, Social Science, Natural Science, etc.). According to this model, the foreign language is the vehicle to

learn these contents and it is through the negotiation of them that pupils learn. Besides this, in his article, Arnau (2001), adds that the content concept is clearly wider, it may be the elaboration of a product, a visit to a shop, a performance, a game, a science topic or unit raised according to a horizontal approach. It can also be an informal situation as a lunch.

These definitions help us to differentiate CLIL in two different lines:

- It is grounded on an integrated approach. Both content and language are based on a continuum, without any preference for one or the other. Both are equal.
- Its roots are contextualized in Europe. Its socio-linguistic and political settings are really diverse and rich.

CLIL refers to the teaching of a subject in a foreign language. It includes Kindergarten and the compulsory education (elementary or primary education and secondary education).

Moreover and to conclude with this point, CLIL acronym has been extensively accepted by the European educational community. AICLE is the term in Catalan and Spanish, that was named with those initials in the middle of the 90s in a TIE-CLIL program (Translanguage in Europe). This program, funded through Socrates, encouraged the plurilingualism introducing CLIL in five languages (German, French, English, Spanish and Italian), its objective was to promote development programs in CLIL for subject teachers and language teachers.

4.1.2 CLIL: its origins

Content and language integrated programs have a really long path in the North of America, where they have described it as a content-based instruction, English language as a vehicle in the curriculum, bilingual education and immersion.

It has suffered a lot of variations in the motivation and aims of the program as well as in its success. Referring to the North of America, in the middle of the 60s in

Quebec's Schools, an immersion program started. It was carried out as a parent's initiative.

As an example, also in the United States, in Miami 1963, the massive influx of Cuban refugees resulted in an increase in the number of children who did not speak English at schools in Miami-Dade. Due to this new situation, a bilingual program started in the school Coral Way, in which Spanish-speaking Cuban children and American children could be schooled and educated in English and Spanish, benefiting both groups and learning two languages. The results of this implementation were very satisfactory for students, both learning the two languages and the content. This conducted to extend the program to other schools in the area and then to other states interested in the project. Its greatest expansion took place in the period of 1990s to 2000, from 40 to 281 programs. Thereby we can notice how the situation of US immigrant students conducted to look for solutions in terms of learning languages.

In 1968, US, *The Bilingual education* law, also known as Title VII of the Act of 1965, was published. This was the first law which recognized the needs of students with limited English proficiency. Gardner (2008) and Lopez Morales (2009) point out that its approval permitted for the first time that bilingual programs initiatives in public schools were financed by the government.

On the other hand, in 1995 the Council of Europe decided to promote the learning of two European languages, in order to encourage its citizens' mobility. The principal aim was to increase effectively the level of competence in one of the two languages students learn by the time they leave school.

They promoted two initiatives to improve the learning of languages (these initiatives need to be worked together). The first one was to lower the age for beginning the teaching-learning of the foreign language. The second and equally important was to introduce programs where that language functions as the vehicle to teach the other subjects.

To increase the competence in the foreign language, the European Union defended more intensive courses and more hours of contact with the foreign language.

Currently it is supported by authors like Dr. Do Coyle (2010, P.2) who explains “We are entering a new era in the development of content and language integrated learning. Over the last decade there has been an explosion of interest in CLIL in Europe and beyond, as many teachers, learners, parents, researchers and policy-makers have realized the potential of CLIL and interpreted this potential in very different ways. Indeed, the fact that CLIL is open to wide interpretation is its strength since the ways in which different languages are learned and used, including the first language, need to be embedded in the local and regional learning context”.

Concluding with this paragraph, CLIL is a recent pedagogical approach that started to develop in the 80s, driven by the success of immersion programs (60s) where all or some parts of the curriculum are taught in the second language.

4.1.3 CLIL aims

Some of the general aims referred to CLIL are (Escobar, 2001):

- To use a foreign language to teach and learn content.
- To promote the real world contexts into classrooms introducing real texts and materials.
- To guide the classroom to different types of interaction, promoting the communication of authentic, meaningful information where content is prioritized.
- To motivate teachers to use strategies that help the comprehension of curricular content and to facilitate contextualized metalinguistic reflection when understanding and production troubles appeared.
- To encourage the practice of linguistic (comprehension and production of the oral and written skills) and discursive abilities (description, argumentation, exposition, etc.).
- To encourage the transfer of learning processes and promote positive attitudes towards plurilingualism.

Moreover, apart from the general aims, and as I want to design my didactic proposal **in primary education**, CLIL exposes some objectives for this educational period, according to Marsh (2002):

- To develop the student's ability to acquire and learn a foreign language.
- To acquire the internationalization through the developments of student's abilities in a foreign language.
- To stimulate and encourage the interest in foreign language proficiency at an early stage.
- To demonstrate the practical value of the foreign language projecting it as something more than just another subject and as a tool for the real world.
- To offer a broader view of the world and encourage them to accept the cultural diversity more easily.

4.1.4 Principles supporting CLIL

CLIL method increases the confidence of the students in the foreign language as they spend more hours practicing it. They acquire the specific vocabulary of the areas of the curriculum and they communicate their own ideas and knowledge. In this way, they get a better level in the language than the students that learn the language by more traditional methodologies (with fewer hours studying the language).

There are four components or principles related and connected to CLIL. These are usually named as the "4 Cs" according to Coyle (2002) to have a balanced CLIL curriculum (Content, Communication, Cognition and Culture):

- **CONTENT:** The subjects or curricular areas that are taught.
- **COMMUNICATION:** It refers to the language used in the subject, both in oral and written way. CLIL promotes the increase of hours in which students use this language. In this way students confidence grows at the same time that their communicative abilities in the vehicular language improve. (Kay Bentley, 2010).

To achieve a fluent communication in the classroom, it is necessary to develop the Basic Interpersonal Communicative Skills (BICS) which are related with the type of language needed in language exchange situations in a habitual environment (no academic). Furthermore the Cognitive Academic Language Proficiency (CALP) is more related with the language students need to learn the subjects and contents. They analyze language needs to express the ideas and knowledge in an appropriate way (vocabulary, grammar, language functions ...).

The use of the second language in the classroom increases student's exposition to it. This helps to find environments in which language exchange is more real. Students should be able to use the vehicular language not only to learn grammatical forms but content; otherwise it would not be CLIL (Do Coyle et al., 2010).

- **COGNITION:** This approach develops cognitive skills so as students are able to study different areas. We can divide the cognitive skills in two groups:
 - **Lower Order Thinking Skills (LOTS).** To remember previous concepts, to order, define, compare and contrast, identify, predict, etc.
 - **Higher Order Thinking Skills (HOTS).** To classify, to make hypothesis, to reason, to evaluate, to have a creative thinking, etc.

Both lower order and high order cognitive skills are worked in each project or didactic unit carried out in the classroom. They are developed through different tasks or activities.

- **CULTURE:** This determines the way in which we construct the world; we use the language to express and interpret the culture. In this way CLIL lets and promotes students to have different experiences. Experiences that they couldn't have if they were working only with their mother tongue. CLIL promotes intercultural experiences that are essential to understand the globalization (Do Coyle et al., 2010).

4.1.5 CLIL Characteristics

I have also to consider CLIL characteristics that are based on the principles mentioned in the previous paragraph. Moreover, I have also included those ones that are extracted from effective language and content integrated programs.

However, before beginning to expose and analyze the general characteristics and according to Jäppinen's (2005) article, it is important to mention that CLIL environments consist on **four key characteristics** that distinguish it from those in which the mother tongue is used:

1. A large zone of proximal development (ZPD). Students need different supports to acquire the large zone of proximal developments. Jäppinen (2005, p. 151) explains that “CLIL learners need much support to reach the upper limit of their ZPD in terms of extra explanations and help from the teacher and fellow learners, in terms of special gesticulation and movement, in terms of the special features of spoken language, and in terms of supportive materials”.

2. Specific socio-culture-psychological factors. The use of the foreign language helps students to acquire and understand other societies and cultures as Jäppinen (2005, p. 151) says “The foreign language used has an effect on the entire learning situation. It opens a wider view to other kinds of societies and cultures that the learners interpret in a very personal way”.

3. Special discovery learning related settings. Jäppinen (2005, p. 151) defends this aspect explaining that “learner thinks with language, that is, reflects on experience and achieves understanding. The foreign language is not just a tool of instruction but an important tool in the learner’s thinking process”.

4. Informal and natural language learning and development. The foreign language is introduced in the way they have learnt the mother tongue. Jäppinen (2005, p. 151-152) exposes: “CLIL learners learn and acquire the foreign language in much the same way as they have learned their mother tongue”.

According to Lasagabaster & Sierra (2009) and Isabel Perez Torres (2014), **the general characteristics are the following:**

- ✓ **CLIL is about using a foreign language.** The language of the teaching process is one that it is not usually used in the contexts students live in.
- ✓ **English is the dominant language of CLIL.**
- ✓ **CLIL lessons are usually timetabled as content lessons** (e.g., biology, music, geography, etc.)
- ✓ **The teaching process is focused on students to promote their interactions.**
It may be possible by working on student’s day life examples, projects or roles work. Teachers direct and monitor classroom tasks. They give instructions that are clear and understandable, they tell learners the objectives of the task,

describe what they have to do and capture learners' attention to focus on the work.

- ✓ **Easy and flexible teaching in the different learning ways of students.** The teaching has to help and facilitate the understanding of the content and context by the use of texts and reading and listening comprehension. This is carried out through linguistic and paralinguistic strategies. Classroom activities and tasks emphasize meaning rather than forms. The priority is given to fluency and to understand the content of the subject.
- ✓ **Promotes an autonomous an interactive learning to develop pair and group work.** Besides the development of discovery work investigation, comprehension and use of self-evaluations, students learn by doing so as it is an experiential learning by discovering, for solving problems.
- ✓ **To make the input easier to contextualize and understand the task, teachers use different strategies such as demonstrations and experiments.**
- ✓ **CLIL teachers will usually be nonnative speakers of the target language.** In most cases, they are not foreign language experts, but content experts, because “classroom content is not so much taken from everyday life or the general content of the target language culture but rather from content subjects, from academic/ scientific disciplines or from the professions” (Wolff, 2007, pp. 15–16).
- ✓ **In CLIL programs** pupils normally learn less than 50% of the curriculum in the target language.
- ✓ CLIL is normally implemented once students have already acquired literacy skills in their first language (L1). In the first ages, the emphasis is on receptive rather than productive skills of the second language.

On the other hand and as I want to design an effective didactic unit based on this method, I am going to focus my attention on those investigations with good results. In this way and according to Navés (2009), she compiled common characteristics of effective content and language integration programs.

- Student's native language and culture is respected and supported.
- Bilingual teachers had a great level in the target language and in the content of the subject. They have high expectations and trust in their students.

- Non-segregation program, the courses are optional.
- Parent's involvement in the program and coordination of all the agents and parties. Long lasting programs with a stable teaching staff.
- The importance of available and suitable materials.
- Teaching-learning methodologies based on Numrich (1989) that defends emphasizing the prior knowledge and experience, reflecting and anticipating what the following (oral or written) text will be about and the continuum checking of text comprehension. Moreover the methodology is also based on organizing and analyzing the text so as making classifications to help the understanding of similarities and differences.

In short, CLIL could be considered as a foreign language enrichment method and strategy involved in content teaching. Thus, this method contributes to a holistically teaching of language learning. The aim of teachers and all parties involved is to propose and design activities based on these principles and characteristics that establish different themes and topics to apply in other areas (Natural science in my case).

4.1.6 CLIL in Natural Science lessons

Once I have analyzed the general aspects and characteristics of this method, I concrete this content and language integrated learning in Science lessons. In this way, I'm going to expose how science contents are taught and learnt through the foreign language.

For this reason I have focused my attention on an investigation made by Escobar (2009) that shows us how Science contents are worked in the second language. This investigation was made in collaboration with secondary education teachers and teacher trainers from the Language Didactics department from the autonomous University of Barcelona. It was implemented at three schools in 2005 and two more schools in 2006. It lasted around 7 to 10 lessons.

The first aspect to begin working was to **choose the topic** and to give reason about its election. They decided to work "The forest" and first they made a list about the main areas they wanted to develop around the subject- matter target. After that they **selected the target language content** that it was based on Content Obligatory Language (COL). This term was named by Snow et al (1989) and defines it saying that

for each content or topic certain language is obligatory to talk and understand the matter. Following CLOL and attending to the target language content, they included: the topic specific language, the genre specific language and the genre specific text types.

Referring to the **teaching sequence**, they took into account the 4 principles or the 4 “Cs” that Coyle (2002) defends to have a balanced CLIL curriculum (Content, Communication, Cognition and Culture). Furthermore, this purpose and investigation included one more C, named “Critical thinking”. Moreover to favor the active processing of the input made available and to promote the productive communication between the students, **the activities** were based on four criteria established by Skehan’s definition of the task (1998:268): **1.** Meaning is primary. **2.** There is an aim which needs to be worked towards, **3.** The activity is outcome evaluated and **4.** Relationship with the real world.

The whole **sequence** was based in **3 tasks**, the first one was named “Jigsaw task” (become an expert), the second one was a “problem solving task” (develop expert report) and the last one was based in an “academic presentation” where pupils exposed the knowledge’s and information learnt.

These tasks were different to maintain student’s motivation by varying the tasks. All of them were designed to be carried out in a collaborative way, by pairs. The tasks involved listening, speaking, reading and writing exercises (in the foreign language), varied oral and written input, digital sources to find information and exercises which develop the visual and the manipulative skill. Moreover the content was presented, recycled, organized and extended progressively across different activities.

The three main tasks mentioned before have a preliminary and follow up task, creating a cycle of three tasks.

Concluding with this section, these are the aspects in which they had based their Science unit through a foreign language. They designed the teaching materials according to the pedagogical principles and then they put it into practice evaluating the results. As the investigation exposes in the article, they had noticed high progress in formal linguistic and discourse features in learners who had not attended to previous instruction on those features. This helped to know the type of benefits that students can

achieve from CLIL. Moreover they identified formal grammatical and discourse aspects that can become the goal of form instructional activities in foreign language complementary lessons.

4.2 MONTESSORI METHOD

4.2.1 Biography and works

Maria Montessori is one of the figures of the educational reform movement called "New School" in the early twentieth century. She was born in 1870 in Italy. She died in 1952 in Holland when she was 82 years old. She studied engineering when she was 14, biology and after that she was accepted in the University of Rome to carry out her studies on medicine. She was graduated in 1896 as the first female doctor in Italy. She was a member of University psychiatric Clinic in Rome. Later, she studied Anthropology and gained a philosophy doctorate. In that period, Montessori attended to one of the first courses of experimental psychology. She was contemporary of Freud and she made her own classification of mental diseases.

In a congress of Turin (1898), she exposed the importance of the education and attention of children with mental deficiencies, the child neglected and the further development of crime. She realized that they had potentials and although they were reduced, could be developed. They deserved a better life without being a burden on society. Since this moment, Maria Montessori decided to dedicate her life to children and created a pedagogic method based on them. In 1907 she founded the first "**children's house**", it was the environment offered to pupils, where they had the opportunity to socialize and develop their own activities; the school as social, educational and pedagogic place. There, she observed children playing with bread crumble as there were no more things in the room to play with. She could observe that they didn't eat them, they only manipulated the crumbs. In this way, she realized that children needed something to play as the human beings need to be active.

Moreover to complete her investigations Montessori studied and based in the following authors: **Itard** (1774) (he established the importance to observe children and defended that we can't impose or force them), **Seguin** (1812) (he studied the causes of

mental deficiencies) and **Pestalozzi** (1746) (he based his work on the importance of teacher's academic training). There is also relationship between **Montessori and Rousseau's ideas**. Rousseau (1762) defended that children must be free and autonomous without being disturbed by adult's interventions opposite to nature. On the other hand Montessori wants the same society. However, instead of achieving the perfection through a "negative" education characterized by no limitations, Montessori looked for it through an organized intervention of the teacher, using the appropriate educative material that permits the child to achieve his autonomy and a harmonious development.

4.2.2 Educative principles and characteristics of the method

Montessori's method is based on 40 years of a great amount of investigations and studies that this author carried out. She discovered that the principal aim of education was not the transmission of information by the teacher but allowing children to acquire the knowledge by their own effort and internalize it as if it was theirs.

This method consisted in developing the autonomy of children that could find in the "house" the indispensable multisensory materials to exercise all the senses with the objects according to their hobbies and physical proportions, so as the possibilities and materials to contribute to their own personal work and according to their free choice, the solving of practical interest problems through the available material.

The dominant and main principle of Montessori's method is to let do, to unwatch and support if it is necessary. Have faith in the immense value of an activity carried out freely with specific aims flayed by the child himself. To be able to drive their own development safely and lead little by little in spontaneous discoveries and achievements. All this according to their natural pace and a succession of "sensitive periods" that are linked to their particular interest and hobbies. Moreover they need to be understood and satisfied at the right time in order not to leave the proper occasion without the indispensable exercise.

Montessori mentions that the combination of freedom and discipline is one of the most important aspects of the methodology. In this way, the teacher has to treat each child individually, guiding him/her, depending on her/his personal requirements and fitting on her/his own pace. They do not exert pressure on children.

The activities are self-directed, children can work individually or in group motivating each other.

General principles and characteristics:

Observation: The child in Montessori's method is a preceptor and speed classifier. He carries out exercises from concrete sensory discrimination to adult intellectual decisions.

Preparation: This method gives the child the proper preparation and practice for training individually and socially. It implies successively greater complexity involved in sensory, motor and intellectual education of the senses, muscle coordination and mental development. It seeks children to develop their full potential in a prepared environment with all materials, infrastructures, affection, respect and relationships between others.

Individuality: The individual work develops the personal interests of the child, not the overall group, thus developing an effective educational environment dedicated to support to know his/her qualities and attributes.

Freedom and spontaneity: The Montessori environment has "graded stimuli" that allows to control errors, provide a "suitable" means to satisfy the lower needs that the child has, their skills and abilities work and functions perfectly. The child in Montessori Method is free to choose the activity he/she wants to work and the time he/she wants to spend on.

The absorbent mind: Children unconsciously absorb the things around them, acquiring knowledge about their environment and adapting to it. Three components: the unconscious, the subconscious and the conscious.

Sensitive periods: During the period of evolution children go through several transitional stages, in which sensibility responds especially to certain learning:

- Sensitive period of the order: the order is related to the human tendency of orientation, children show great attention to the order as they take elements of the environment and know them, establish relationships and thus develop their intelligence.

- Sensitive period of the movement: movement is necessary to achieve a positive psychological development. This allows them to meet and interact with the environment
- Sensitive period of language: is directly related to the ability to speak, write and read.
- Sensitive period of refinement of the senses: since they are small, children are sensory explorers because they want to know everything and they do it thanks to their senses.
- Sensitive period of socialization: is related to build the personality.

Prepared and structured environment: where everything is provided for the needs of children. It should be organized carefully for the child to learn. It consists of two factors; **the environment and material**. It has to be clean and neat; the materials have to be next to the children and designed to their needs, learning from sensory experiences. Furthermore, the environment must promote constant movement activities encouraging independence and freedom. In this way, the environment and materials have to facilitate the motor, sensory, social, intellectual and emotional development.

Materials: They are very important in this methodology and they play an important role in children's learning. Maria Montessori designed materials attending to all children's needs and with a learning aim. There are lots of materials, attractive, natural, and progressive; they must have their own error control. Children have free access to them and they can choose the activity to carry out, they help them to progress in an appropriate pace with increasingly complicated exercises. They can be made of glass, metal or wood.

The teacher: according to Montessori Method, the teacher must be prepared spiritually and in skills. She or he has to be careful, reflective and apply the best values. The teacher has also to monitor and guide the learning process of the children and communicate effectively without pressing them. There is an indirect intervention; they only offer the necessary materials to pupil's development. Moreover the teacher must be connected with the educational program in an educational way.

4.2.3 Montessori's method in pupils of primary education

It is important to say that Maria Montessori based her method specifically in pre-primary students but she also proposed it in primary and secondary education. She only reached to verify in practice their postulates in child by nowadays her bases and principles are implemented in primary (childhood) and secondary (adolescence) education.

In this section I am going to develop the characteristic of primary education students according to Montessori's "constructive rhythm of life". Moreover I am going to explain how are their classrooms, the distribution and how do they learn.

According to Montessori, the human development (from 0 to 24 years) is divided in 4 stages, each one of 6 years. This sequence of shots was called by Montessori the "constructive rhythm of life." In this section I am going to expose the second development stage established by Maria Montessori. I am going to focus my attention on the primary education stage and its pupil's characteristics as my didactic proposal is based on this elementary stage.

YEPEZ (1998) explains that **Childhood (from 6 to 12 years)**, the second stage of Montessori's stages, is a period of reasoning and imagination. The intelligence and research are based on experiences of the previous period. During this time, Montessori takes into account the reasoning power of the child and his/her imagination. The association instinct is very strong, so children are encouraged to form groups of learning.

- From 6 to 9 years. Children learn to use their intelligence and the learning tools. They also learn to use their time in a constructive way.
- From 9 to 12 years. This is the period in which they have their greater learning capacity. If they have learnt to use their tools in the previous stage they are prepared to investigate freely following their own interests.

Elementary or primary children in general are characterized by their questioning minds, their ability to imagine and their social orientation. Their ability to research and explore is unlimited. Through their efforts and discoveries they move from the concrete to the abstract, in this way they expand their knowledge. According to Montessori the

mind of pupils in this stage is similar to a fertile soil disposed to take everything that later will become into culture. They need to learn through their own activities and the education must answer their intellectual needs but without forcing them. The main questions pupils make in this stage are: why? How?

Primary education students work in small groups on lots of projects that encourage their imagination and engage their intellect. Montessori teachers direct these children towards activities helping them to develop the reasoning abilities and arts of life.

In a Montessori elementary classroom, there can be a small group sitting on the floor, with a teacher giving a lesson. Other children can be working individually, in pairs or in groups of three or four. The shelves and furniture are full of science experiments and materials. There are boxes and closets with card materials and schemes and guides of the projects to remind pupils the steps to discover and find things by themselves. There are also collections of books referred to practical work near them. The classroom is plenty of interesting work and meaningful activities that pupils develop in a congenial environment.

Every child in elementary education has his/her own path of progress that develops step by step according with the contract he or she has established with the teacher. There are usually 25-30 pupils per classroom with 2-3 teachers that work together to attend and guide every child individuality.

Referring to the evaluation and as Edwards (2002) says, in Montessori Method and elementary education there are not exams or tests as in the traditional education, instead pupils are evaluated throughout extensive descriptive information about their daily life and progress that is sent to their parents. The primary source of information for teacher referring to child learning is the observation; they use checklist, portfolios and anecdotal records to follow individual child progress through the curriculum. Teachers make extensive notes and observation of pupils individual and group work or portfolios. The portfolios are sent and shared with the families at the end of the year and the teachers meet frequently with the families to talk about development issues. Furthermore, teachers also create panels, slide presentations, booklets or videos to show projects and to interpret pupils learning process.

To conclude, teachers could also prepare memory books or “diaries” from the anecdotal notes (taken through the school year), photos, children’s work or products and other documents to show each child experience in the school and this becomes a farewell award to the family. Moreover, this is used to make children reflect on themselves as group member and individuals and help them to incorporate it in their self-identity and autobiographical memories of their life.

4.2.4 Montessori’s method in the teaching of Natural Science

To begin with this section I consider important to mention that Montessori’s elementary curriculum include geography, botany, biology, physics, chemistry, history, music, art and peace. They are named by Montessori “the cultural subjects” or Cosmic Education. Duffy and Duffy (2002) defend that Montessori elementary classroom’s core is the integrated curriculum. Maths and language have to be the vehicle to build the knowledge but they shouldn’t be shown as the center.

Montessori believed that these “cultural subjects” or science subjects curriculum had to be based on the “Great Lessons” or “Great Stories”. These great lessons were various stories that introduced pupils contextualizing them in the topic, engaging child’s imagination, appealing to their emotions, creating curiosity to discover more information for themselves. As Murray (2009, p.29) says, these stories help “to create a picture in the children’s minds and to send them off wondering, questioning, and exploring in order to fill in the details of that picture”.

In the book *Cosmic Education - Children of the universe*, written by the Association “Educación para la vida” (2016), we can find an example of these “great stories” implementation in the teaching of the topic of Universe to elementary children. This is an example of how Natural Science is taught in Montessori primary or elementary education. They introduce the topic with the story “birth and death of stars” that creates a context to help pupils to understand the contents and serves them as a hook to draw their attention. Once the pupils have listened to the story they are ready to carry out the experiments designed to discover the universe concepts in more detail. They lead pupils to do and experiment without intervention. Moreover, the experiments are carefully designed to be simple and comprehensible to prevent teacher’s intervention. The teacher disposes all the materials and writes the command cards that

guides the pupils, sometimes the teacher helps giving a demonstration of how to use the materials. The pupils are monitored by the teacher to be sure that they use the materials properly and safely. Furthermore, the command cards and materials give pupils all they need to learn important science fundamentals and principles. In this experience, while pupils work experiments individually or in small groups, they learn science principles and vocabulary.

To conclude, in the same book, we can find a similar example with animals and plants topic. Once students are introduced to the topic with the story “History of life”, they continue studying with real living things in the classroom. They focused on the external visible parts through classification cards that include images, names and definitions. The games are made of paper materials, the definitions are cut into strips, and pupils have to join the definition with each word and image. Once the teacher has presented the names of the parts of the plant, pupils work alone guided by the command cards that shows them how to use the material and the steps to develop the activity.

5. NATURAL SCIENCE DIDACTIC PROPOSAL “THE PLANTS” IN 1ST GRADE OF PRIMARY EDUCATION

5.1 INTRODUCTION AND RATIONALE

The present didactic proposal “The plants” is planned taking into account the Content Language Integrated Learning aspects (analyzed in the previous theoretical framework). The aim of its practical implementation is pupils to learn the plants contents, to develop the scientific competence through English at the same time that they develop the speaking, listening, reading and writing skills of this language.

Moreover, while pupils acquire English skills, they are going to learn “The plants” topic through some aspects of Montessori’s method. The activities proposed work with materials based on Montessori Method in order pupils to know, use and learn through them. Furthermore, its design takes into account the prepared environment, the autonomy and experimental learning of the child as well as their freedom to choose the activity and the time spend for it that Montessori defends in her method.

In this planning the teachers are going to be guides, monitoring, helping and providing materials and the command cards to pupils, so that they could discover and learn the concepts by themselves. The teachers don’t give master explanations, only when pupils need and ask for help, the teachers explain the concepts through demonstrations and examples.

On the other hand the reason to choose this topic “The plants” is because it is included in the curriculum for the teaching of the Natural Science subject, besides Montessori gives importance to it as it is a topic of the Cosmic Education or “cultural subjects” of her method and elementary education curriculum.

This didactic proposal “The plants” is thought to be worked with 25 pupils of 1st grade of primary Education in “Los Fresnos” Montessori School. This school is located in Alpedrete, a town of Madrid’s community. Situated on a large plot with gardens, sports courts and playgrounds, this private school is prepared to receive students from

kindergarten, primary and secondary education. I have chosen this school as it follows the British education combined with Montessori Method, the perfect school to contextualize this didactic proposal. During primary or elementary education, pupils of this school receive an academic program in which the 50% (more or less) of the program content is taught in English. The practical activities of Montessori Method are fully incorporated in the educational process of this stage.

Furthermore, the reason why it is not contextualized in a public school is because these types of schools do not follow Montessori methodology

On the other hand, the proposal or project is not organized in structured and ordered lessons but in free activities disposed around the class that pupils are going to develop during 2 weeks in the way they want and in the order they want. The only structured lesson is the first one as the teacher has to contextualize the topic, after that pupils work freely in the activities disposed. For this reason, the activities and materials proposed are organized in 5 spaces around the classroom, as if they were corners of activities, each corner of activities has a name and a question that pupils can read (the words in black):

- Observation and experimental space: **“Our plants” Who I am and how do I grow?**
- Observation and experimental space: **“Our plants experiments” What happens?**
- Listening and speaking space: **“Our plants songs, stories and videos” What do you know? What have you learnt?**
- Writing and practice space: **“Our plants games” What parts do I have? Which is my growth process?**
- Reading space: **“Our books” Do you want to know more?**

Each corner or space has different activities that are explained in the development section of the present didactic proposal. In addition, pupils are going to have a portfolio where they could add all their discoveries, worksheets and writing exercises they find in each corner/space of activities and materials.

To conclude with this introduction and rationale, in the following sections I explain the aims, contents and competences thought to be achieved and developed with

this proposal. Furthermore I add the timing, the methodology, the distribution of the materials and activities in the classroom and the development and explanation of each space of activities. To wrap-up, I expose some conclusions taking into account its weak and strong points.

5.2 AIMS

5.2.1 General aim:

- To develop and work the scientific knowledge and conceptual understanding of nature with pupils of 1st grade of primary education through CLIL and Montessori Method.

5.2.2 Specific aims:

Pupils through the discovery and autonomous learning defended in Montessori Method are going to achieve the specific aims exposed bellow:

5.2.2.1 Natural Science aims

- To learn and identify the parts of the plants.
- To identify different types of plants.
- To learn the life cycle of a plant.
- To introduce the plants observation experiments.
- To develop habits of respect and care of plants.
- To learn and value the group work, showing cooperation attitudes and responsible participation, adopting a constructive behavior to accept possible differences of ideas.

5.2.2.2 English aims

- To acquire the vocabulary and to use it in different ways.
- To listen and to understand messages of different verbal interactions.
- To express and to interact orally in simple situations and habitual that have a content and develop know, using verbal, not verbal language and adopting a respect attitude and cooperating.

- To write simple texts with variety of aims about previous treated topics in the classroom.
- To read simple texts in a comprehensive form, related with their experiences and interests, extracting information to work with it.
- To value the foreign language and the languages in general as a way of communication and understanding between people with diverse origins and cultures and as tool of learning different contents.
- To develop the four skills: speaking, listening, reading and writing by doing and practicing different activities and tasks.

5.3 CONTENTS

As I mention in previous sections the didactic proposal is designed to work with pupils of 1st grade of primary education and is named “The plants” so it is based on Natural Science subject contents.

The contents to work are the following and are divided into two groups:

5.3.1 Thematic contents

The Living Things

The Plants: observable characteristics and recognition

- Parts of the plant.
- Types of plants: plants that bear fruit and flowering plants.
- Life cycle of the plant.
- Plants observation experiments. The plants need light, air and water to live. (+ light + air)
- Habits of respect and care of plants.

5.3.2 Linguistic contents

Functions

Pupils are going to use and develop English linguistic functions to:

- Give advice: “I think...”

- Make Requests: “Can I...? Can you...? Can you help me?”
- Apologize: “I’m sorry, I’m so sorry but...”
- Agree: “I agree, I think so too, You’re right”
- Disagree: “I understand what you are saying, but...”
- Offer: “Can I help (you) (with...)?”
- Ask for Opinions: “Do you think ...? Please tell me your opinion on...”
- Give Opinions: “I think that ..., I believe (that) ...”

Skills

While pupils learn the plants contents they are going to develop the four English skills:

- Listening skill: Pupils develop this skill throughout the entire didactic proposal, specifically through the story telling activity, the song listening comprehension exercises, and the plant story listening comprehension exercises.
- Speaking skill: Students have to communicate orally, always in English so they develop this skill. Moreover, there is a specific exercise where they work this skill, the song exercise.
- Writing skill: Pupils all over the didactic proposal have to write their observations and learning in worksheets that they add to their portfolio. They use simple sentences to write in English.
- Reading skill: As with the previous skills, pupils work this one through all the activities proposed. In each activity they have to read the command cards that explain them the steps they have to follow or how to use the materials. Furthermore, there is a space in the classroom named “Our books” where they can take plants books and read them.

Lexical items

The lexical items refer to the vocabulary and verbs that pupils are going to learn and use:

- Nouns: Limbo, midrib of a leaf, petiole, base, root, main root, stamen, corolla, pistil, sepals, calyx, stem, leaves, branches, trunk, tree, flower, plant, fruit, seed.
- Verbs: Sow, transplant, grow, to plant, to water.

5.4 COMPETENCES

I have to mention that although this didactic proposal is not based on LOMCE Spanish law, pupils through this didactic proposal develop the competences established in it and I consider important:

- **Linguistic competence:** Pupils work this competence all over the didactic proposal as they have to communicate with their classmates and teacher always in this language. They develop this competence in all the skills.
- **Mathematical competence and basic competences in science and technology:** Students develop the mathematical competence with the amounts of substances they need to develop the experiments. Moreover the entire didactic proposal is about science as they learn basic concepts about plants.
- **Digital competence:** This competence is developed in the “Listening and speaking space: “Our plants songs, stories and videos” What do you know? What have you learnt?”, as pupils work with digital resources to listen to songs, stories or to watch videos.
- **Learning to learn:** Pupils develop this competence all over the proposal as they have to learn in an autonomy way, by their shelves and the help of the command cards. They learn the concepts learning to be autonomous.
- **Social and civic competence:** This competence is developed while pupils are grouped in their tables working in an exercise or task as they have to socialize with others. Moreover they learn to be civic citizens as they develop the habits of respect and care of the environment.
- **Sense of initiative and entrepreneurship:** This, is one of the most developed competences in this proposal, as pupils choose the activities they want to carry out following their interests and their initiatives. They also make decisions to change of activity following their sense of entrepreneurship.
- **Cultural awareness and expression:** Pupils work this competence as they are using a language that is not their mother tongue and it does not belong to their culture.

5.5 TIMING

The activities proposed to work in this didactic proposal are thought to be developed at the beginning of the second term, during 2 weeks, in the stipulated hours of the Natural Science subject in this grade: 3 lessons per week, namely, in 6 lessons. However, it is important to say that one of the activities included in this proposal, the one of the “Observation and experimental space: **“Our plants” Who I am and how I grow?”** is going to be extended throughout the rest of the school year, as pupils have to observe the growing process of a plant and this does not happen in just three weeks.

On the other hand, it is important to say that although it is expected to be worked in three weeks, we have to take into account the different pace of the pupils respected in Montessori’s Method and their freedom to have the time they want in each activity or task. In this way and once we have implemented it in a real classroom, it may last more or less than three weeks. Otherwise, according to the aspects mentioned before, 3 weeks, 6 lessons is the time in which I consider pupils can develop the activities.

5.6 METHODOLOGY

As I have repeated in former sections, **this proposal works with CLIL and Montessori’s methodology**. Pupils learn the plants contents through English, so through the activities proposed they develop the four skills of this language: Listening, speaking, reading and writing with simple and clear command cards.

Moreover, referring to **Montessori Method**, this proposal develops her principal aim that is: education was not the transmission of information by the teacher but children could acquire the knowledge by their own effort and internalize it as if it was theirs. In this proposal pupils learn by themselves, monitored and guided by the teacher and the activities and materials he/she proposes them. **The students learn in an autonomous way**, they learn by doing, by experimenting and respecting their freedom to choose the material and exercise they want for the time they want. They can work individually or in small groups.

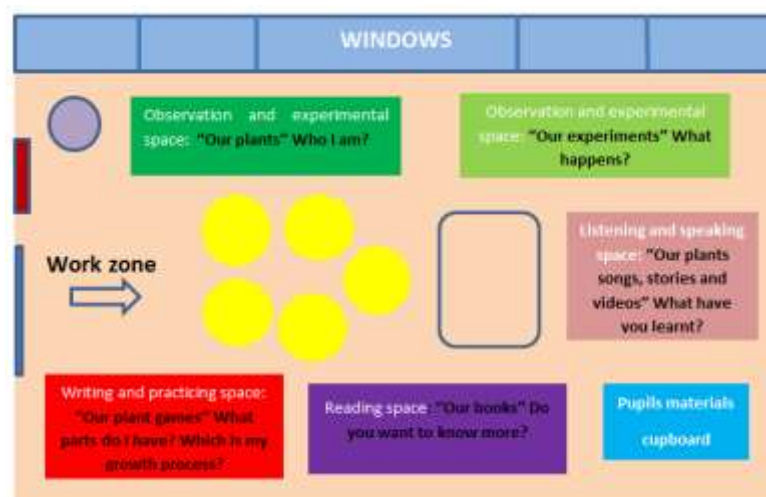
Furthermore, this didactic proposal works with the **prepared environment** proposed by Montessori: clean, order and neat with all the materials available and accessible to the pupils. **The materials** used have been prepared according to

Montessori's characteristics; there are wood and paper materials, they have their own error control which helps pupils to use their reasoning abilities, encourages their independence and gives them a fast feedback that permits pupils to self-correct. They have been designed conducting pupils to achieve the autonomous learning and to discover on their own the plants contents. There are some commands cards that guide pupils in how to use the materials or the steps that they have to follow in an activity.

To wrap-up, and according to Montessori Method, to carry out this didactic proposal we need **two teachers**. The teacher's role is to guide and monitor, they don't give master explanations. They are going to provide pupils with the materials and activities to carry out and students do it alone without teacher's pressure. They are going to act when pupils need and ask for help or some explanation.

5.7 DISTRIBUTION OF THE ACTIVITIES AND MATERIALS IN THE CLASSROOM

The environment of the classroom in Montessori's method is one of its main principles. For this reason I have designed a classroom distribution of the activities and materials that is accessible to pupils. The environment must be order, clean and neat. Moreover pupils know the rules; they know that everything they take, every material they take, must return orderly to the place where it was. If one pupil goes for some material and is not in its place, they understand that is being used for one of his/her classmates. The distribution of the classroom is the following:



In the top of the image we have the windows, next to them, two different shelves where there are disposed the materials and activities of the corners: Observation and experimental space: **“Our plants” Who am I and how do I grow?** and Observation and experimental space: **“Our plants experiments” What happens?** The reason to place these two different shelves next to the windows is because pupils are going to plant a seed (to observe its growth) and also because they are going to make experiments with plants, so they need direct sunlight. Furthermore next to these shelves, the small soft purple circle is a sink, where pupils can take the water to water their plants. It is next to the plant activity in order not to flood and soil the rest of the classroom. The red small rectangle near to the sink is the door of the class. Next to the door, the long blue rectangle is the clothes rack where pupils leave their coats and similar.

On the middle of the classroom, we have the work zone. The yellow circles are pupil’s desks, organized in groups of 4 or 5 pupils. Next to them, the blue rectangle is a carpet where pupils can also develop their activities. Just near it, the pink rectangle is the Listening and speaking space: **“Our plants songs, stories and videos” What do you know? What have you learnt?** where pupils can find a digital board and a computer to carry out the activities proposed to this space.

On the bottom of the image and to conclude with the distribution, just opposite the windows (in front of them) we can find three more cupboards with shelves. The red rectangle is the shelf of the Writing and practice space: **“Our plants games” What parts do I have? Which is my growth process?** The purple rectangle is the shelf of the Reading space: **“Our books” Do you want to know more?** and the blue rectangle is the cupboard where pupils can leave their works and portfolio.

5.8 DEVELOPMENT OF THE ACTIVITIES

To begin with and as I have mentioned in the introduction, according to Montessori Method (her respect of children different learning pace and freedom to choose the activity and the time for it) this proposal does not have a structured order of lessons or lessons structured by activities. In this way, the classroom (its environment)

is prepared on 5 spaces or corners that are interrelated and where pupils, during 2 weeks, can learn the plants contents through different activities and materials that the teachers make available. The pupils can spend the time they want in each space, they can also change to another corner or return to the first one when they want and when they think that they have achieved the aim of the activity. Furthermore in each space, pupils can find a worksheet to add to their plants portfolio.

5.8.1 Explanation of the activities and materials of each space:

This didactic proposal is presented to pupils with a story telling, “The little seed” story telling. The pupils sit in a semicircle in front of the teacher and he or she tells the story with an appropriate intonation and dramatization (**Look for the story telling in Annex I**). This plants story telling contextualize pupils in the plant topic, helps them to know what they are going to learn and proposes some questions about it that serves as a hook, drawing pupil’s attention for further studies. Moreover it is a good resource to begin with the project as it is a listening activity where pupils can learn how to pronounce correctly the specific words in English and functions as a warming up to develop English skills (first they listen, then the speak, write and read). Some of the questions that “The little seed” story telling proposes extrinsically are the following: How does a plant grow? What does a plant need to grow? What type of plants can we find in the environment? What are the parts of a plant? (Besides the story telling has a moral that pupils can learn).

Once the story telling is finished and the questions are proposed, the teacher explains pupils that they have around the class different spaces, materials and activities where they can discover the answer to the questions that the story telling proposes or what they want to know about plants. Pupils know that they can be in each corner or space of activities for the time they want, that they can change of activity when they want and that they can repeat the activities and use the materials the times they want. Moreover, they can also choose the order to carry out the activities. The teacher can advise them and propose a contract with the order to develop the activities but then pupils are free to choose following their interests and autonomy. The activities and materials proposed for each space are the following:

5.8.1.1 Observation and experimental space: “Our plants” Who I am and how I grow?

As I have explained in the distribution of the classroom, this space consists in a cupboard with some shelves where the materials, the activities and the command cards are available and accessible for children. This shelf is next to the windows, as we need the sun light to develop the activity.

The materials are distributed and disposed in open boxes in order to make visible to pupils. Each box has the name of the materials that it contains. The materials are the following:

- 5 watering cans in a box.
- Sandbags in two boxes.
- Seeds of beans (a plant that bears fruit) in a box.
- Seeds of marigolds (a flowering plant) in a box.
- Yogurt containers and pieces of cotton in a box.
- My seed diary (20/25 copies of this small book) in a box.
- Easy command cards supported by images and pasted in the shelving.

(See “My seed diary” in Annex II and the simple command cards in **Annex III**)

The activities proposed for this space are the following:

With the materials exposed before and following the steps that the simple command cards give them, pupils have to sow the seeds, they are going to sow their own seeds. Pupils are free to choose one seed to sow or both of them. After that, every day, pupils have to take care of them watering when necessary. In this way, they are going to observe the growing process or life cycle of their plants and they are going to identify two types of plants (a plant that bears fruit and a flowering plant. Besides they are going to develop habits of respect and care of plants.

The next activity, once the plants have grown, is to transplant them in a flower pot.

Moreover the book they can find in this space, “My seed diary”, is a small book with a title page and a drawing of a flower. Inside it pupils find some pages where they

can draw the growing process of the seed and write simple observations of it each week. The activities proposed on the other spaces are going to help them to know how to write those observations. Pupils learn doing and observing.

Furthermore, it is important to point out that this is the only activity that is going to be extended throughout the rest of the school year, as pupils are going to observe how different plants grow and this does not happen in just two weeks.

These types of seeds germinate in 7-10 days, in the next 3 days the leaves and stem appears and then they continue growing until they get the fruit or flower. That is the reason for we need the rest of the school year to continue developing and working this activity.

5.8.1.2 Observation and experimental space: “Our plants experiments”

What happens?

This is the space or corner of the experiments. As the previous corner of activities, this one consists in a cupboard that is located next to the windows, as we need the sunlight to develop the experiments. This cupboard is divided in three different shelves. Each shelf has the materials pupils need to develop each activity or experiment.

1st shelf of the cupboard:

The materials that we can find in this shelf are distributed in boxes and are the following:

- Transparent glasses in a box.
- Celery plants and different colored dye in a box.
- A watering can in a box.
- An easy command card supported by images and pasted in the shelving.

The activity proposed to carry out with these materials is to make an experiment. Pupils develop the experiment following the steps that the command card gives them. If pupils don't understand something they can ask the teacher for help, but we have to lead them to do it alone. The command card asks them: What happens? With this experiment pupils discover that the celery plants have been stained as they have absorbed the

colorant. One of the conclusion that pupils can learn is that plants need liquid to live (they can also learn more thing following their interests).

(See the command card of this experiment in **Annex IV**).

2nd shelf of the cupboard:

The materials that we find in this second shelf are also distributed in boxes:

- Transparent glasses in a box.
- Weak celery plants in a box.
- A watering can in a box.
- A simple command card supported by images and pasted in the shelf.

The activity design to develop with these materials is another experiment that pupils make following the steps of the command card pasted in the shelf. Once they have finished the experiment, the command card asks pupils, what happens? With this experiment pupils discover how a weak plant that is dying revives thanks to the water. The conclusion pupils can learn is that plants need liquid to live.

(See the command card of this experiment in **Annex V**)

3rd shelf of the cupboard:

In this shelf pupils can find the materials to carry out the last experiment:

- Transparent glasses in a box.
- Celery plants.
- A box with sugar and spoons.
- An easy command card supported by images and pasted in the shelving.

As in the previous ones, pupils are going to carry out an experiment with these materials. Pupils have the support of the command card that gives them the steps to do it. Pupils can ask themselves, what happens? With this experiment the students learn that the celery plants have absorbed the water with sugar, so as if they eat it, they can taste that the plant has changed to sweet. One more time the plant has absorbed the water as it needs it to live.

(See the command card of this experiment in **Annex VI**)

It is important to remember that pupils can carry out the three experiments in the order they want. They can start with the 3rd shelf experiment, then continue with the 1st shelf experiment or whatever they want. There is not a structured order to carry them out. They are also free to develop the ones they want and when they want during these 3 weeks of plants proposal.

We have to take into account that these experiments may arouse their curiosity or interest to create their own experiment, mixing different substances they have in the shelves to know what happens. The teacher has to accept that they are developing their interest and their sense of entrepreneurship.

5.8.1.3 Listening and speaking space: “Our plants songs and stories” What do you know? What have you learnt?

In this space pupils are going to develop the listening and speaking skills at the same time that they learn plants contents. In this space, pupils can find a digital board throughout they are going to develop two different activities. Furthermore they use and work with new technologies.

In this way the **materials** proposed in this space are the following:

- A digital board with two options and activities to open: “The leaves of the tree” song and “The lucky seed” story.
- A worksheet with exercises about the song.
- A worksheet with exercises about the story.

The **activities** proposed to this space is a **song** named the “**The leaves on the tree**” and a **story** named “**The lucky seed**”. Pupils can click one of them or both. If they open the song option, pupils can listen to the song, sing and dance with it. The song talks about the evolution and appearance of a tree in each season, besides is supported with images in order to help pupils comprehension. After listening to the song (once, twice or the times they want) they have a worksheet with exercises about it, where they can practice the vocabulary and realize if they have understood what the song says. This worksheet can be added to their plants portfolio.

(See the song lyrics, the link to listen to the song and the worksheet with the exercises in **Annex VII**)

Moreover if they open the story option, they can listen and watch a short, funny and clear story about the growing process of a seed told by cartoons. After that they can complete a worksheet with three simple exercises and add it to their plants portfolio.

(Read the story, the link of the video and the worksheet with the exercises in
Annex VIII)

Once they have completed the worksheets exercises they can ask the teacher for the answers worksheet, in order to check them by themselves.

5.8.1.4 Writing and practice space: “Our plants games” What parts do I have? Which is my growth process?

In this space pupils can find a cupboard with some shelves in which there are disposed some games distributed in boxes with its own command card and worksheet. Pupils can play with them at the same time that they learn the names of the parts of the plant and the names and definitions of the growing process of the aforementioned.

The materials proposed for this space are the followings:

- A puzzle of a tree and its worksheet in a box.
- A puzzle of a root and its worksheet in a box.
- A puzzle of a leaf and its worksheet in a box.
- A puzzle of a plant and its worksheet in a box.
- A puzzle of a flower and its worksheet in a box.
- A memory game of the growing process of a plant and its worksheet.
- Two command cards. One with the steps that explain how to use the puzzles and another command card with the steps they have to follow to play the memory game. The command cards are going to be pasted in the shelves.

The activities pupils are going to carry out with these materials are the following:

- **Puzzle game “The parts of the plants”:**

Pupils following the command card have to take the wood puzzles (its pieces) and form them in a worksheet that is a template of the puzzle. The template shows the

drawing of the puzzle (a tree, a root, a leaf, a plant and a flower) and some arrows with white boxes to put the name of its parts (stem, pistil, limbo, etc.). First they have to form the puzzle in the template and then they have to take the name of the parts and put them in the correct white box. After that they have to write the name of its parts in the template. They can add this worksheet to their plant portfolio.

It is important to remember that there are five puzzles and pupils can form them in the order they want and when they want. If they want, they can play with one of them one day and continue with the rest other day.

Another aspect to point out is that the teacher can present first the parts of the plants and then pupils alone, carry out the activity.

(See the wood puzzles in Annex IX, the worksheets (templates) in Annex X and the command card in **Annex XI**)

- **Memory game activity “The life cycle of a plant”:**

In this activity pupils have two groups of paper flashcards: one with the pictures of the steps of the growing process of a seed and the other with the name or definition of each step. Pupils following the instructions that the command card gives them have to face down all the flashcards and then make pairs: each picture with its definition. If pupils have problems to know if their pairs are correct, they can ask the teacher for the answer sheet. They look for them and they check them by themselves.

Pupils can add the learning about the growing process of the plant to their portfolio copying the definitions of each process, supported with a drawing or whatever they want. They are free to add this learning to their portfolio in the way they want, following their interests.

(See the flashcards in Annex XII, the command card in Annex XII and the answer sheet in **Annex XIV**).

5.8.1.5 Reading space: “Our books” Do you want to know more?

This space acts as a support for pupil’s discoveries and learning. It is a cupboard where pupils can find some books about plants. There are adapted books of plants for children of this year. There are stories of cartoons that explain how they sow a seed,

how they look for the growing process of their plants and there are also stories about different plants, plants that bear fruits and flowering plants.

Pupils can go to this space whenever they want, take a book, read, look for their drawings and so on. Moreover when they feel curiosity for something, they can also attend to this space and take a book. In this way pupils develop the reading skill.

(Look for the books proposed in **Annex XV**)

5.9 ASSESSMENT

As we know in Montessori Method there are not exams, pupils learning process is evaluated by teacher's observation throughout checklist, anecdotal records or their portfolios. In this way teachers are going to make descriptive notes and observations about children's daily life in the classroom and about their individual and group works.

Teachers are going to meet frequently with parents to talk about their pupils learning process and they could see their children portfolios (in this case their plants portfolio).

To summarize, teachers are going to evaluate pupils following three different documents:

- Observation and anecdotal sheet of each pupil. **(See in Annex XVI).**
- Checklist assessment of each pupil. **(See in Annex XVII).**
- Pupil's portfolios following the criteria established in the checklist.

6. CONCLUSIONS

To begin with this section I want to mention the difficulty that I have had to find information about Montessori Method in elementary education and how lessons and the different subjects are taught through it. It is important to point the fact that Montessori Method is more based on pre-primary education so when I found information about elementary education, most of the documents were protected, if you wanted to access to them you had to pay for them. Anyway, I have been fortunate to meet through a social network, a member of Montessori's Association who has provided me the documents I need to complete this report. Referring to CLIL theory and information, there have been no problems to find it. The Content language integrated learning is currently addressed by many authors and from different points of view.

Moreover this report has helped me to know where and what information I need to take. It has helped me to learn how to summarize information, what is the main and essential and which is unreliable and I have to throw away. Besides, I could train my English, writing all the report in this language (it has been a challenge for me). In addition, it has awoken my creativity to design a didactic proposal based on CLIL and Montessori Method, forgetting the common structured didactic units that I used to plan.

Referring to the aims proposed at the beginning of the report, I consider that this document has achieved them. My objectives with it were to know clearly about CLIL and Montessori Method to implement them after in a didactic proposal. From my point of view, "The plants" proposal is based clearly and in detail in these two concepts as pupils can learn the plants contents through English, respecting their freedom and own learning paces (they can choose the activity they want and spend the time they want with it) and developing their autonomy. Moreover and according to Montessori Method, the classroom environment is prepared with rich and varied materials and activities accessible to pupils that help them to discover, experiment, do, arouse their curiosity and learn. I consider that this didactic proposal can be implemented in a Montessori school.

On the other hand and as a negative point or limitation I have to say that as I couldn't put it into practice in a real classroom, the time thought to be carried out, may vary. As I expose in the former section, the didactic proposal is planned to be developed

in 2 week (6 lessons) but according to pupil's freedom to spend the time they want on one exercise or another, it depends on the student's rates. For this reason, the didactic proposal can be developed in 2 weeks, more than 2 or less than 2. Furthermore, as I have not implemented, I couldn't observe which ones are the activities and materials that motivate pupils, which ones interest them most, which ones least, as well as the activities that work best and the ones that are not effective.

Planning the didactic proposal I have realized that teachers in this type of education have a lot of work and that they have to be well prepared to carry it out. As they are pupil's guides and monitors, they have to provide the appropriate materials and activities to conduct them to learn by themselves, autonomously. In this methodology, they don't restrict to follow a text book step by step, for this reason, they have to design all the materials and activities taking into account and observing each pupil.

To wrap-up, I consider that this methodology and the didactic proposal exposed can be implemented in the future in public education schools, as it would be good to maximize and encourage pupil's thought, reflectivity, imagination, interests, curiosity, creativity and autonomy. However for that, our government should consider among others that a change in methodology of science teaching is necessary, that more than one teacher is needed in each classroom, that children need enough space to carry out their activities so they need big and roomy classrooms and that pupils require lots of rich and varied materials, therefore investments in education are necessary.

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8. ANNEX

ANNEX I

PLANT STORY TELLING “THE LITTLE SEED”

Once upon a time, in a small garden of a house in the country there were many plants, flowers and vegetables. This garden was divided by a wooden fence. In one part of the garden there were flowers and plants and in the other part of the garden an Orchard, in which Mr. Jack, the owner of the garden, planted vegetables.

In the corner of plants and flowers was a small seed. It was the smallest with only tiny leaf. Around it they grew lots of flowers: roses, lilies, violets, tulips and daisies.

The problem was that the little seed did not grow, unlike the plants and flowers around it. The plants observed daily to the little seed and say to it: "You are very simple and ugly, you will never grow"

At the same time the flowers laugh at it saying: "Look at yourself in the pools of water, you don't have colorful petals like us. Just a simple, ugly leaf peeking out from your outbreak."

The small seed cried inconsolably saying: Why do I not grow? Why do I have only one leaf while others have beautiful colors and long leaves?

In the garden of Mr. Jack, flowers and plants sang sweet melodies. They were very happy because they lacked few days to finish winter. But the voice of the little seed could not hear, as it had a very low tone that barely listened with too many songs. The little seed was very sad, the flowers and plants were friends between them and they ignored it.

One day Mr. Jack went to the garden with gardening tools and in one of his hands a pot with a pea's plant. The plant had a shiny green leaves. Mr. Jack took it and moved, placing it next to the little seed.

The small seed looked amazed at its size. Shyly she decided to speak to it and with its soft voice murmured: "You are really big and beautiful!"

The green plant looked around and realized that the sweet voice came from below. He looked at it and said. "Oh you are so small. I bet that when spring arrives you will be a beautiful and tall flower. You have to wait to the warm heat of the sun's rays and to Mr. Jack, he will water you".

It was the last day of winter and gray clouds covered the sky. Suddenly it started to rain so hard, as if Mr. Jack were throwing abundant water from the sky. The flowers and plants were scared because the wind was blowing so hard so that their petals and leaves began to fall. Fortunately, the little seed was protected by its new friend. The green plant covered the seed with its long leaves and said: "Small seed rain will finish, be not afraid, I will protect you".

The next day, the green plant woke quickly as the rays of the sun lit their leaves. "Wake up dear friend". It shouted to the seed.

This was no longer a simple little seed. He had grown more than ten centimeters and now had broken out several sheets! Looking in the pools of water the seed asked: "Who I am, a plant or a flower?"

After some days, Mr. Jack's garden welcomed spring. The arrival of insects gave birth to new flowers and plants began to grow.

The small seed grew and grew being one of the tallest flowers. After a time some golden petals began to appear from its head and looking at its reflection in a window of the house, it exclaimed happily: "How big I am, I'm a sunflower"

Flowers and plants begin to grumble about the seed changes and they were very repentant for his previous taunts, so they decided to ask for forgiveness.

The sunflower without rancor forgave them and since then became close friends, promising to never make fun of any seed, plant or flower for smaller or simpler they were.

At the end and thanks to the many trips insect friends, more seeds born from which sprouted and became into other sunflowers.

ANNEX II

“MY SEEDS DIARY”



Draw the process of the seeds and write what happens.

Week 1	I can see that _____
Week 2	I can see that _____
Week ...	I can see that _____
Week ...	I can see that _____
Week ...	I can see that _____
Week ...	I can see that _____

<p>Week ...</p>	<p>I can see that _____</p>
<p>Week ...</p>	<p>I can see that _____</p>
<p>Week ...</p>	<p>I can see that _____</p>
<p>Week ...</p>	<p>I can see that _____</p>
<p>Week ...</p>	<p>I can see that _____</p>
<p>Week ...</p>	<p>I can see that _____</p>
<p style="text-align: center;">Who I am?</p>	

ANNEX III

COMMAND CARDS TO SOW A BEAN SEED

1. Take a yogurt container and introduce a piece of cotton in it.



2. Take the bean seed put it inside the yogurt and put another piece of cotton above.



3. Pour some water into the container.



4. Wait for the seed to grow. Write your name in the container. Water them every day.

COMMAND CARD TO SOW THE MARIGOLD

1. Take a yogurt container and introduce sand on it.



2. Take 6 marigolds seeds and introduce them in the land.



3. Take sand and put it above the seeds.



4. Pour some water into the container.



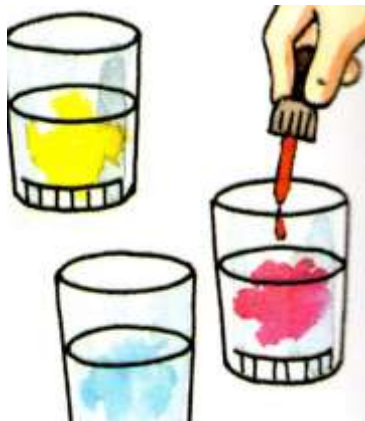
5. Wait for the seed to grow. Write you name in the container and water them every day.

ANNEX IV - 1st Experiment command card

1. Take 3 glasses and introduce some water in it.



2. Introduce each colored dye in each glass with water. 1 colored liquid for 1 glass.



3. Introduce 1 celery stick in each glass.



4. Wait for some hours. What happens?

ANNEX V - 2nd Experiment command card

1. Take a glass and introduce water in it.



2. Introduce a weak and arcuate celery plant in the glass of water.



3. Wait for a day. Look for it tomorrow, what happens?

ANNEX VI – 3rd Experiment command card

1. Take 2 glasses and introduce water in them.



2. Introduce **4 sugar spoons** only in 1 of the glasses and write sugar on it.



3. Introduce 1 celery plant in each glass, in the one with water and sugar and in the one with only water. Write the names.



4. Wait for 2 days. What happens?

ANNEX VII

“THE LEAVES ON THE TREE” SONG

The song has been taken from Learning English Kids, British Council website. You can listen to it in the following link: <https://learnenglishkids.britishcouncil.org/es/songs/the-leaves-the-tree>

LYRICS OF THE SONG:

“The leaves on the trees are turning green

Turning green, turning green

The leaves on the trees are turning green

Grow, grow, grow!

The flowers on the trees are beautiful

Beautiful, beautiful

The flowers on the trees are beautiful

Busy, busy bees!

The leaves on the trees are falling down

Falling down, falling down

The leaves on the trees are falling down

Yellow, red and brown.

The leaves on the trees have fallen down

Fallen down, fallen down

The leaves on the trees have fallen down

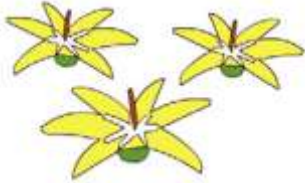
All on the ground.”

WORKSHEET OF THE SONG

Name:

Date:

1. Join each word with its name.



Tree



Ground



Flowers



Leaves

2. Put the sentences in order.



The leaves on the trees have fallen down.



The leaves on the tree are turning green.

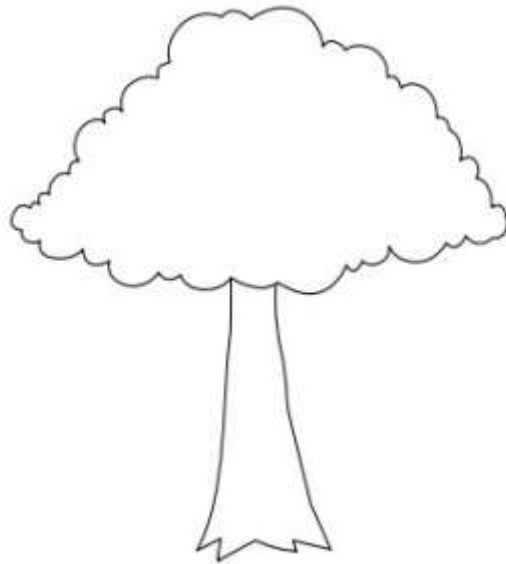


The leaves on tree are falling down.



The flowers on the tree are beautiful.

3. Draw and color some leaves, flowers and a ground for this tree.



ANNEX VIII

“THE LUCKY SEED STORY”

The story has been taken from Learning English Kids, British Council Website. You can watch the story video in the following link:
<https://learnenglishkids.britishcouncil.org/es/short-stories/the-lucky-seed>

THE STORY

“A long time ago, a farmer took a big bag of seeds to sell at the market.

Suddenly, his cart’s wheel hit a big stone. Bump! One of the seeds fell out of the bag and onto the hot, dry ground.

“I’m scared!” said the seed. “I need to be safe under the soil.”

Just then a buffalo walked on the seed and pushed it into the ground.

“I’m thirsty!” said the seed. “I need some water to help me grow.”

Just then, it started to rain. The next morning the seed had a little green shoot. All day it sat in the sun and grew taller and taller.

The next day it had its first leaf. This helped it to catch sunlight and grow. That evening a hungry bird tried to eat it but the seed had roots to help it stay in the ground.

Many years of sunshine and rain passed. The seed became a plant and then the plant became a tree.

Today if you visit the countryside you can see the tree. It is big and strong and now makes seeds of its own”.

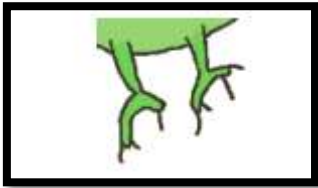
WORKSHEET OF “THE LUCKY SEED STORY”

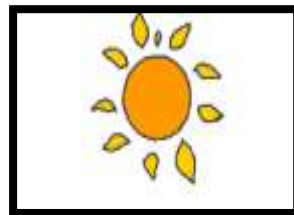
Name:

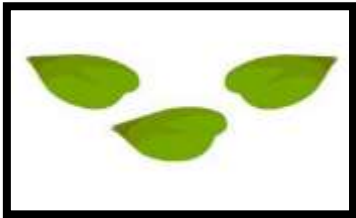
Date:

1. Write the name of each picture with the words of the box:

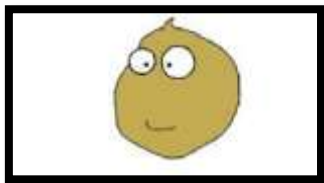
Seed – Shoot – Leaves – Roots – Plant – Tree – Rain – Sunlight

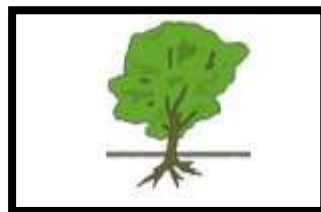


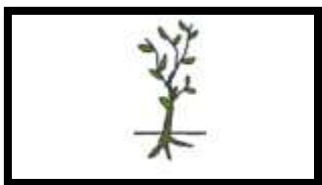












2. What do plants need to grow? Make a cross.

	YES	NO
Water		
Juice		
Air		
Heat		
Birds		
Light		
Soil		

3. Have you got a plant? Draw and write the name.

ANNEX IX

WOOD PUZZLES

The wood puzzles are Montessori's materials from the website "Creciendo con Montessori": <http://www.creciendoconmontessori.com/>



The root:

The tree:



The leaf:



The flower:



The plant:

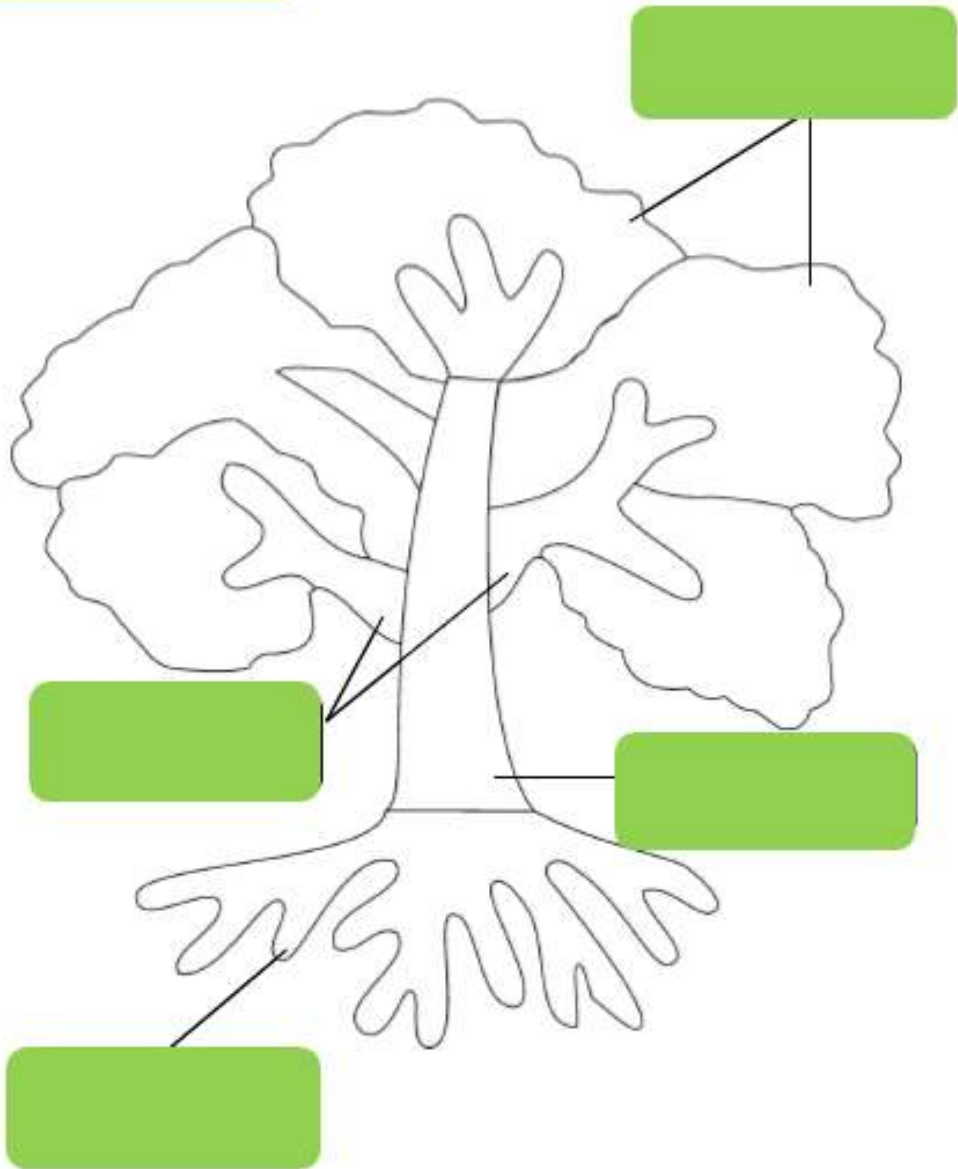


ANNEX X

WORKSHEETS OF THE PUZZLE GAME (TEMPLATES)

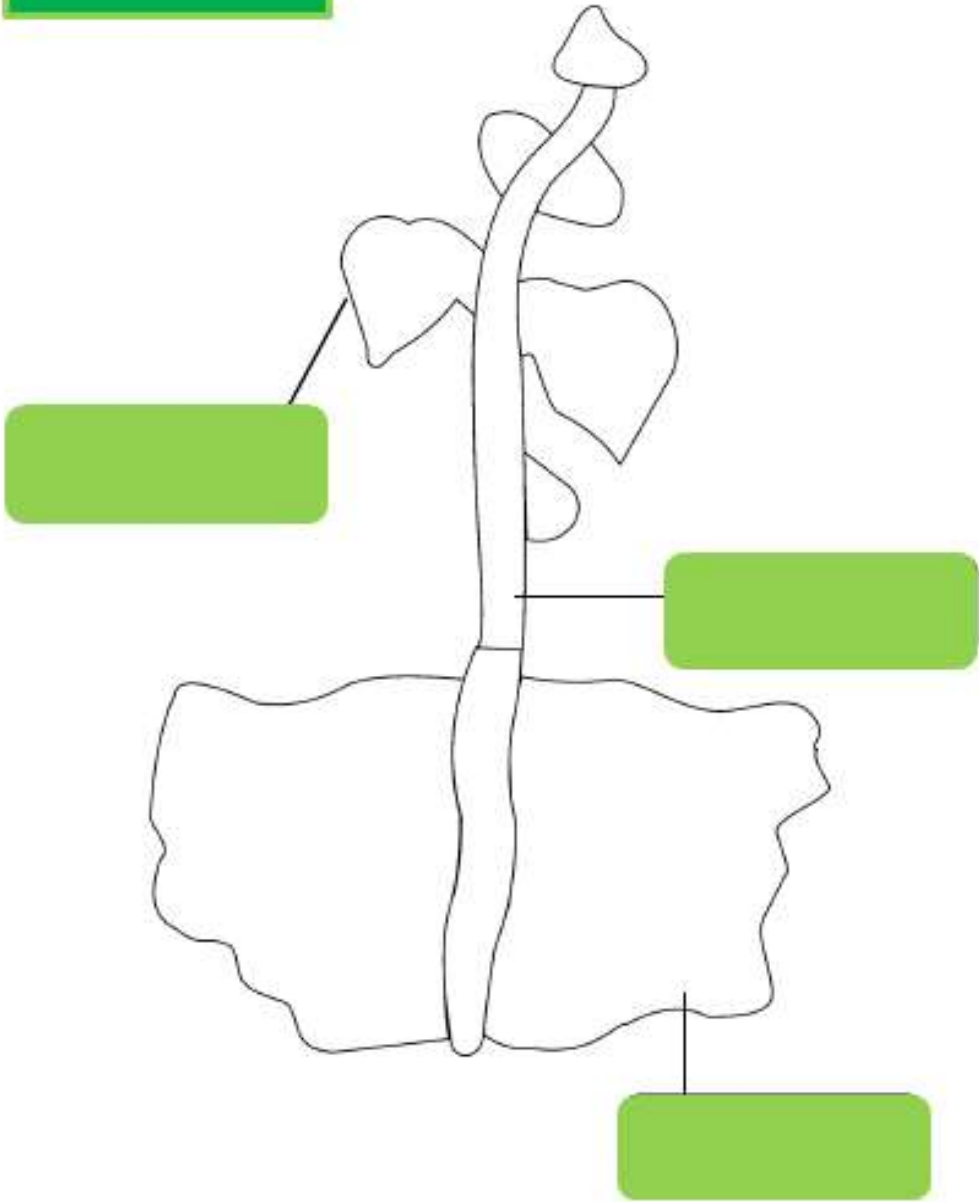
The tree template:

Tree

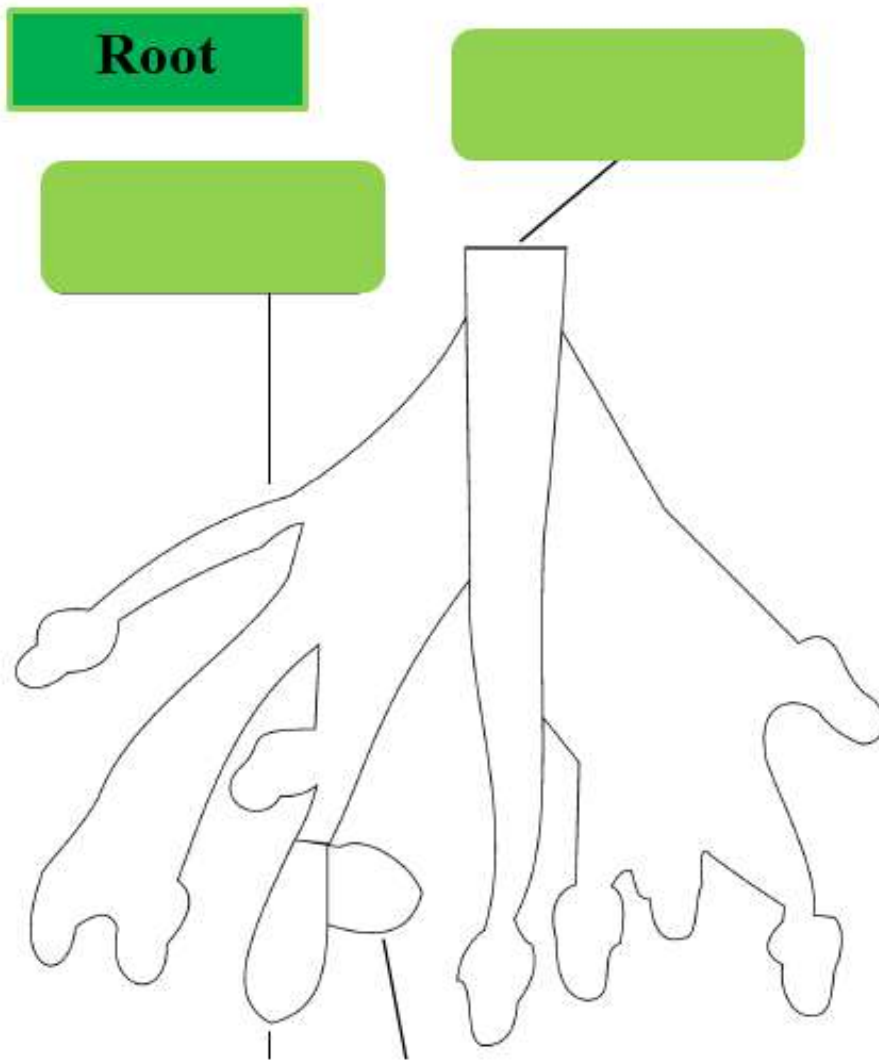


The plant template:

Plant

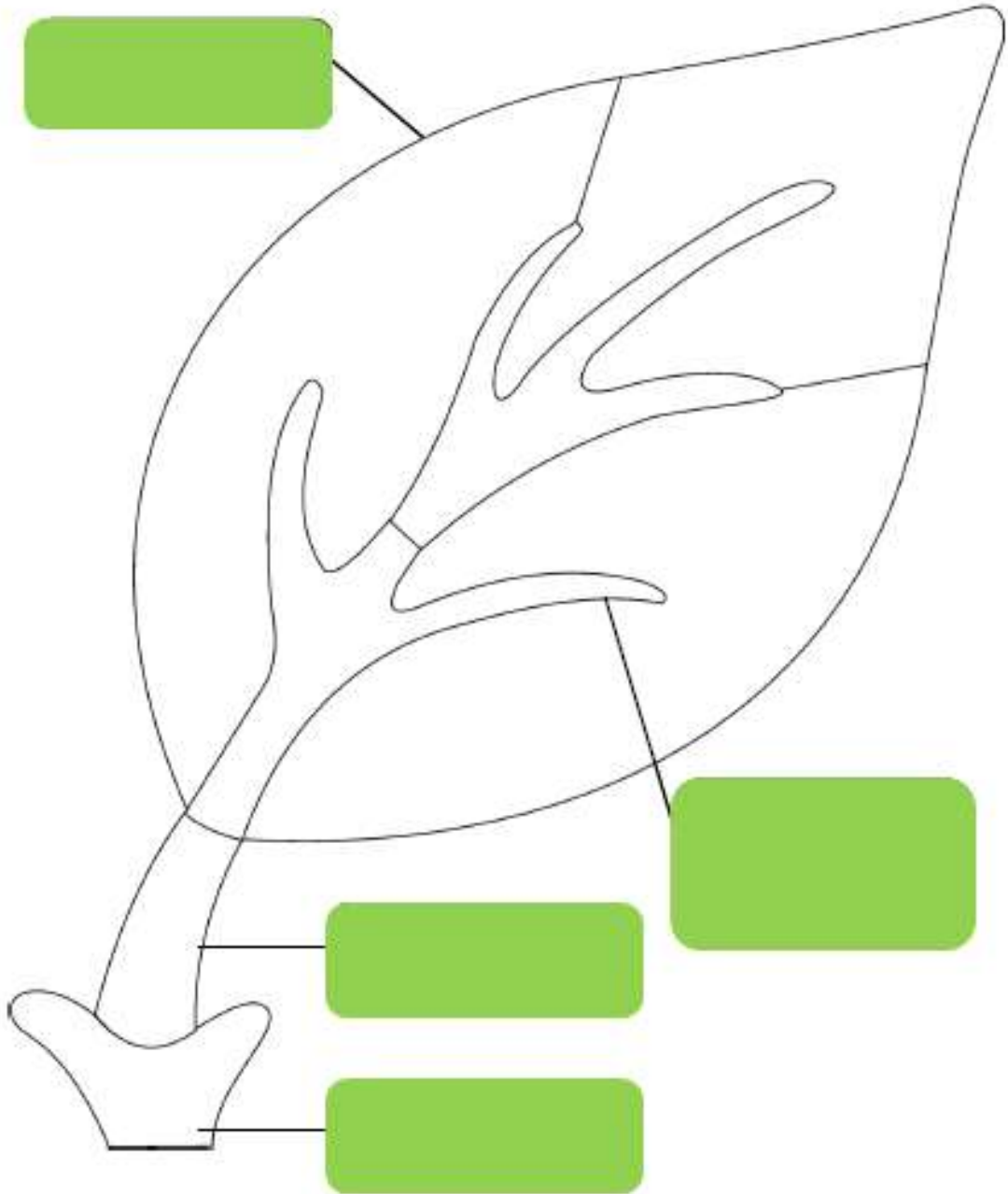


The Root template:



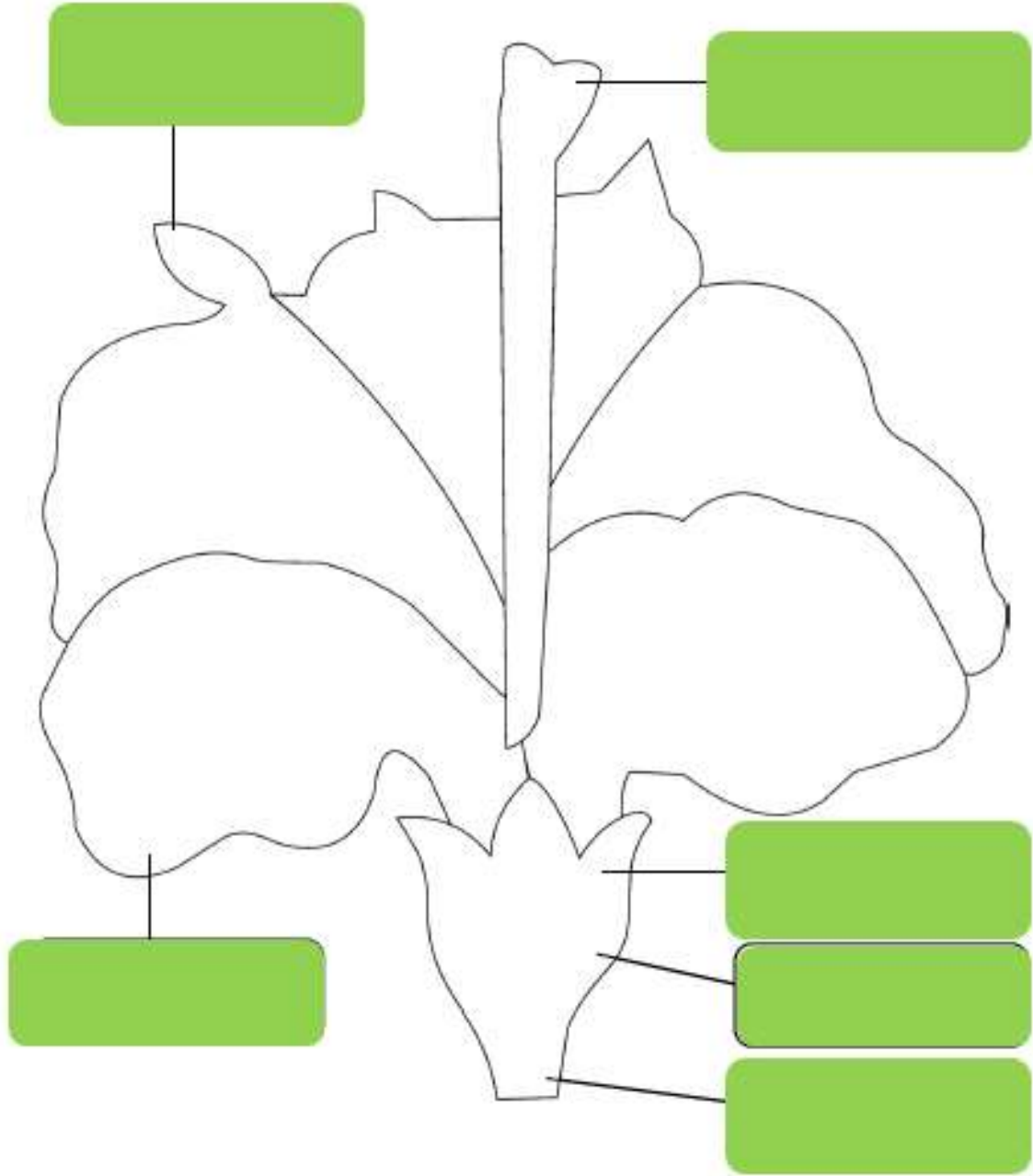
The leaf template:

Leaf



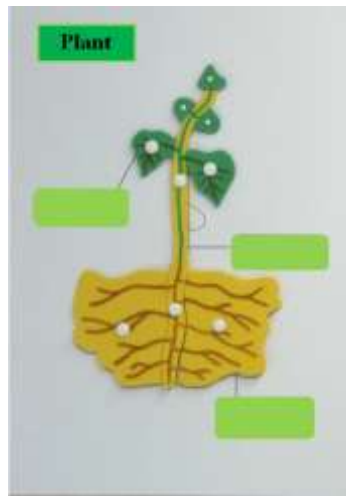
The flower template:

Flower

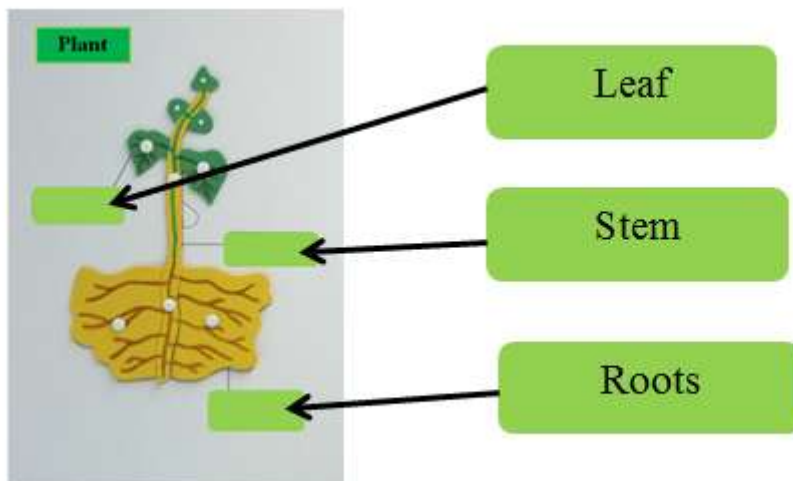


COMMAND CARD OF THE PUZLE GAME

1. Take the wood puzzle and form it in the template. Example:

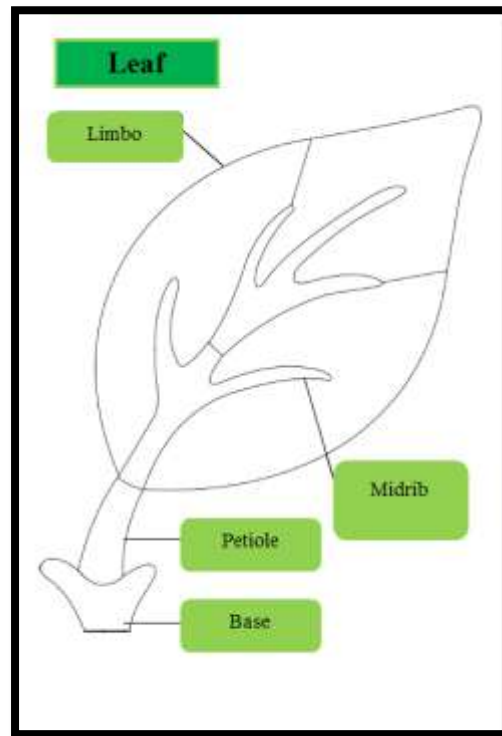
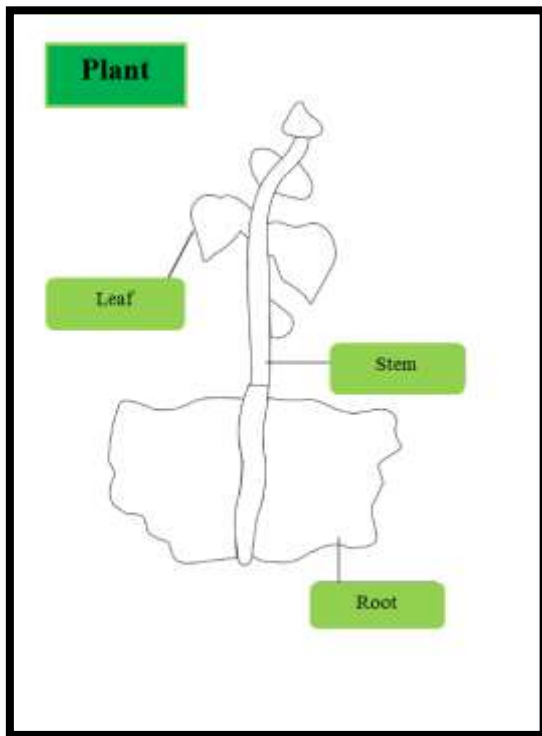
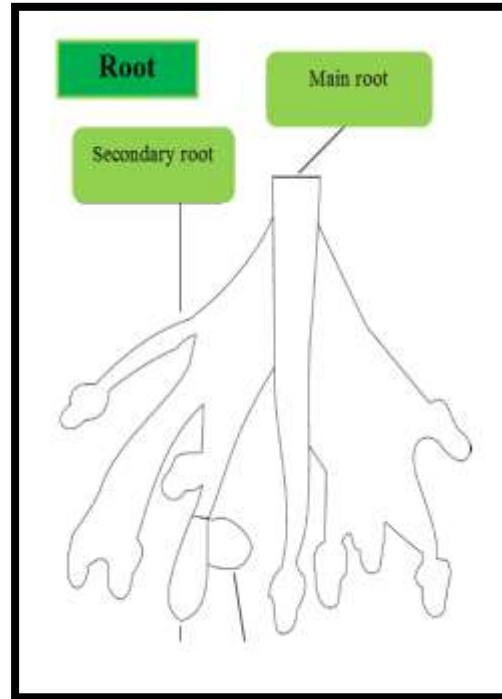
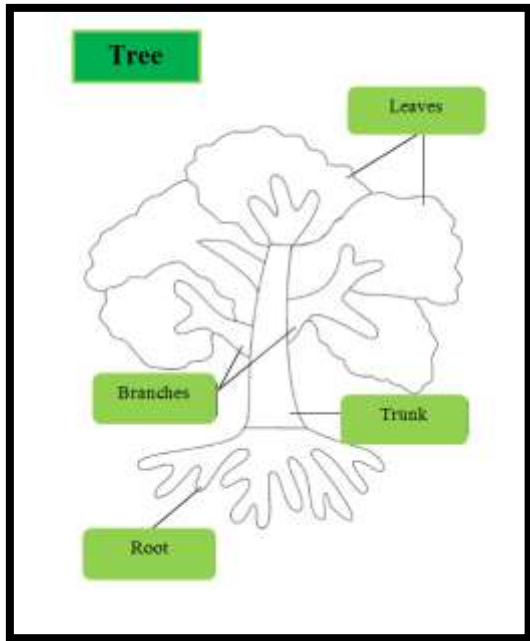


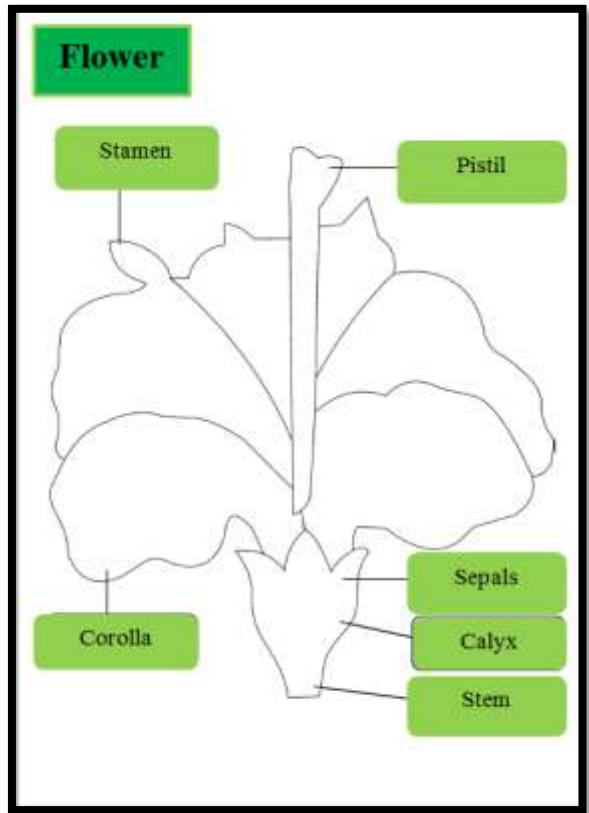
2. Take the names of the parts pieces and put them in the correct box. Example:



3. Write the names of the parts with your pencil in the correct box.

4. Obtain this:



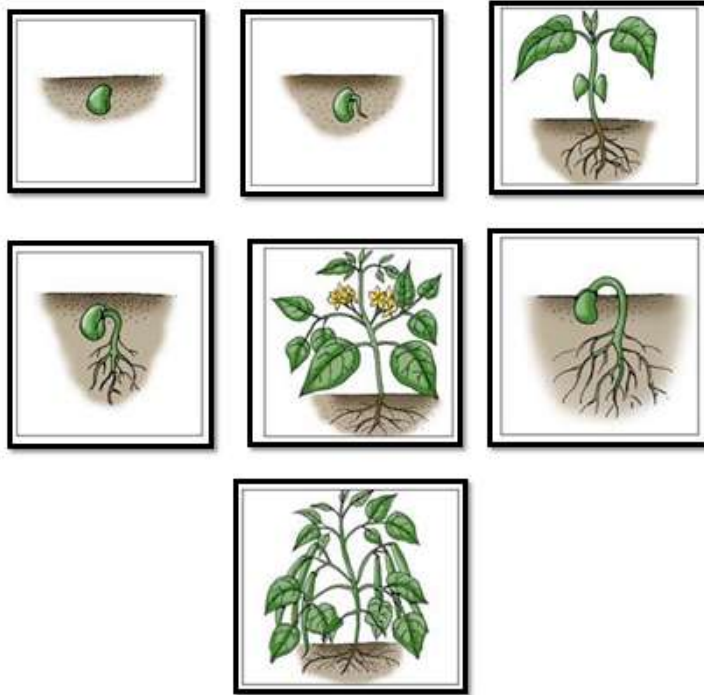


ANNEX XII

MEMORY GAME FLASHCARDS

The pictures for the flashcards are from www.exploringnature.org

Pictures flashcards:



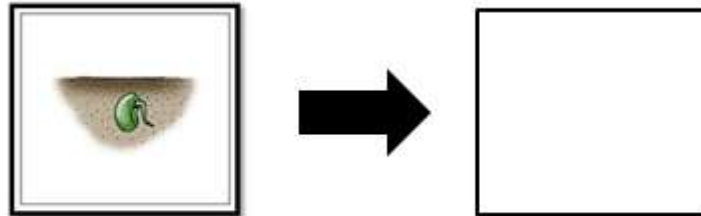
Definition of the pictures flashcards:

- | | |
|--|---|
| 1. The seed. | 5. The seed with the first leaf. |
| 2. The seed germinates | 6. The stem and its leaves grow towards the sunlight. |
| 3. The roots go out from the seed | 7. The flowers grow. |
| 4. The seed grows out from the ground. | 8. The fruit (the bean) grows. |

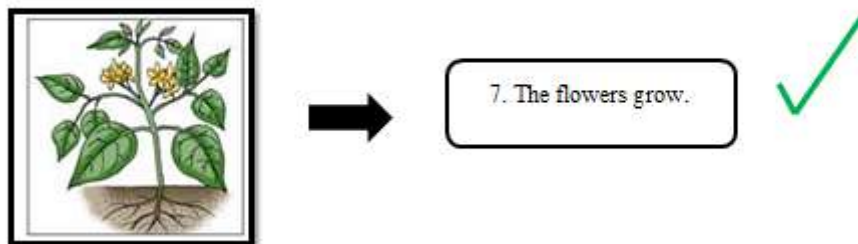
ANNEX XIII

COMMAND CARD OF THE MEMORY GAME

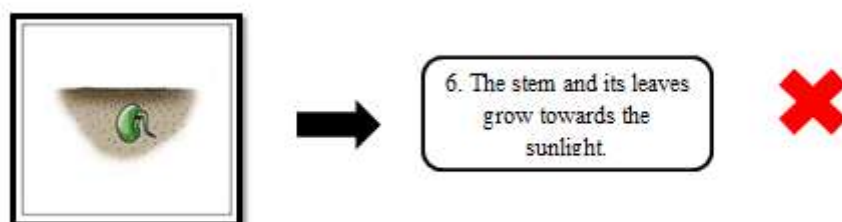
1. Take the picture flashcards and definition flashcards and face all of them down.



2. Face up the flashcards, one by one and make correct pairs: Each picture with its definition. Example:



If the pair is incorrect, face them down and continue playing. Example:



ANNEX XIV

ANSWER SHEET



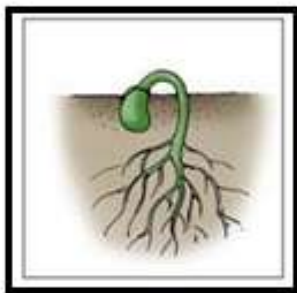
1. The seed.



2. The seed germinates



3. The roots go out from the seed



4. The seed grows out from the ground.



5. The seed with the first leaf.



6. The stem and its leaves grow towards the sunlight



7. The flowers grow.



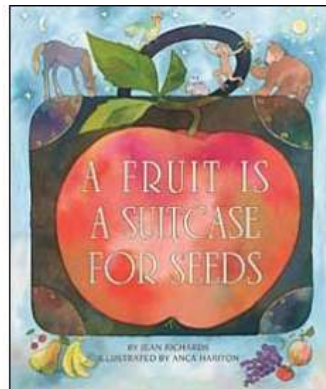
8. The fruit (the bean) grows.

ANNEX XV

BOOKS PROPOSED FOR THE READING SPACE

1. **A fruit is a suitcase for seeds** by Jean Richards and Anca Harrinton:

Cover sheet:

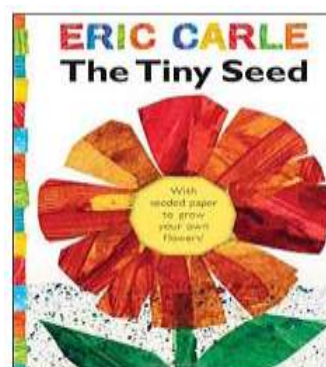


Book inside:

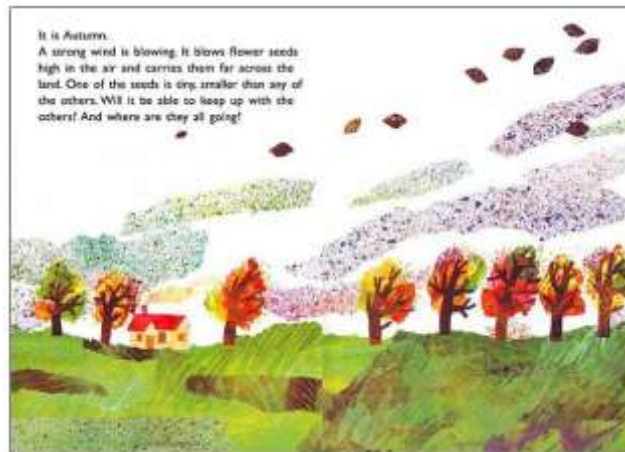


2. **The tiny seed** by Eric Carle:

Cover sheet:

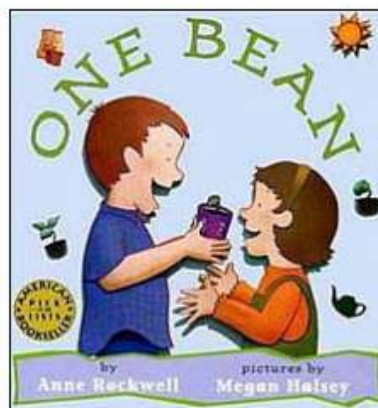


Book Inside:

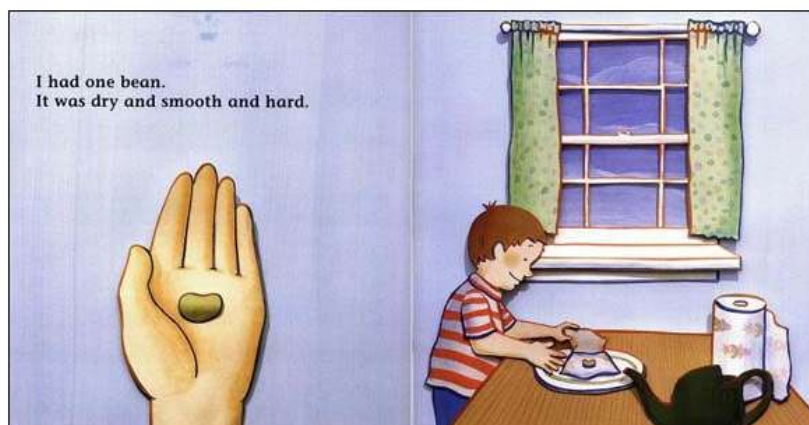


3. **One bean** written by Anne Rockwell and illustrated by Megan Halley.

Cover sheet:

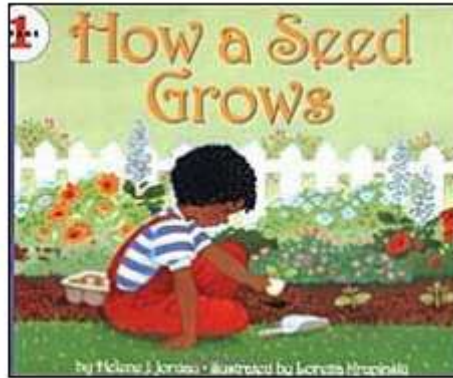


Book inside:

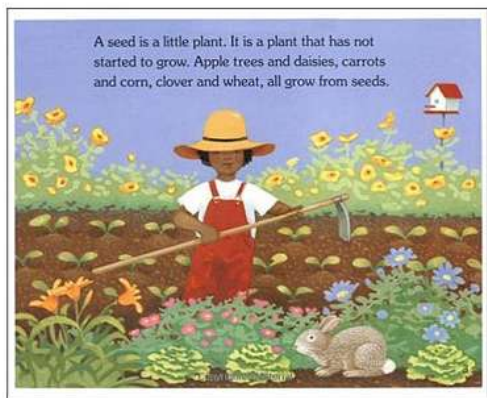


4. **How a seed grows** by Helen Jordan and illustrated by Loretta Krupinski.

Cover sheet:

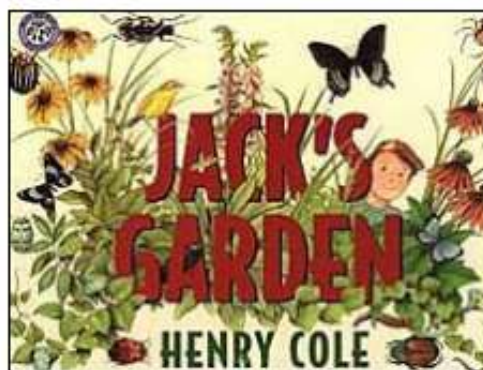


Book inside:

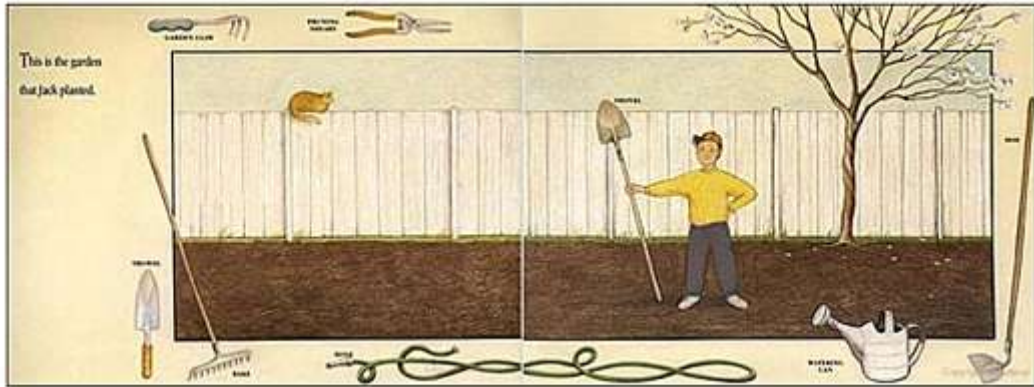


5. **Jack's garden** by Henry Cole:

Cover sheet:

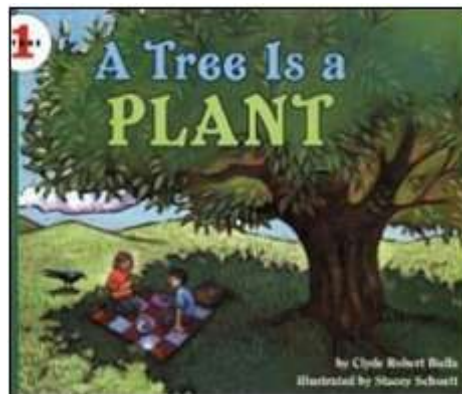


Book inside:

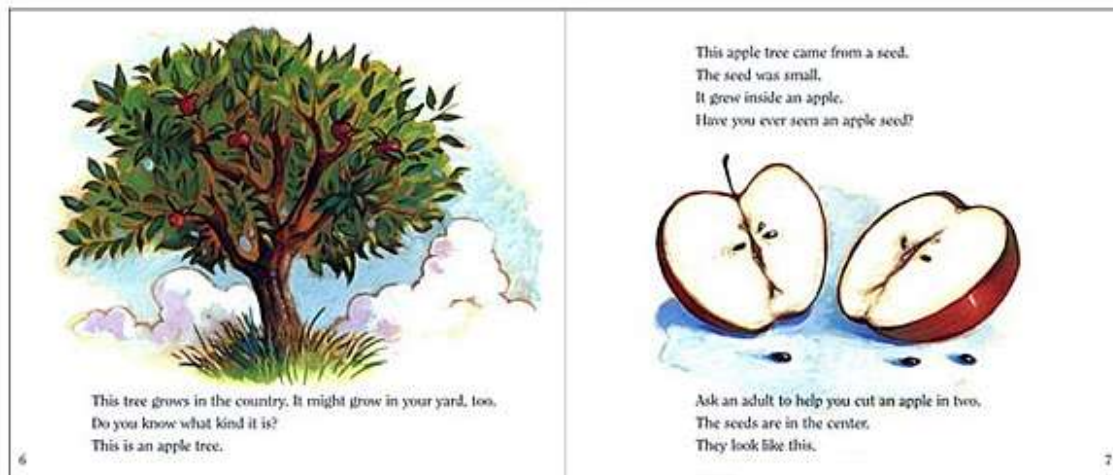


6. **A tree is a plant** by Clyde Robert Bulla and illustrated by Stacey Schuett.

Cover sheet:



Book inside:



7. To be like a sun by Susan Swanson and illustrated by Margaret Chodos-Irvine:

Cover sheet:

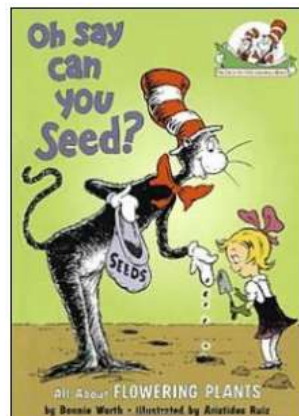


Book inside:

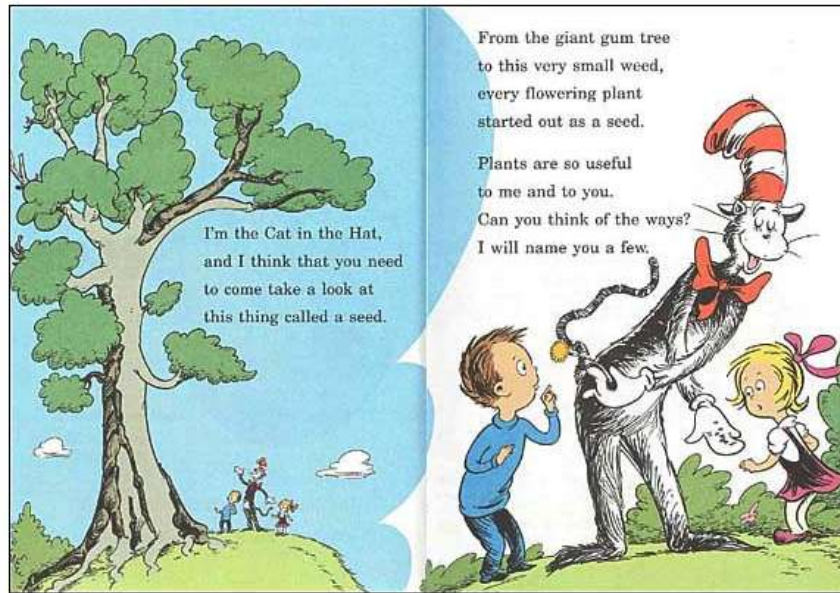


8. Oh say, can you seed? All about flowering plants by Bonnie Worth and illustrated by Aristides Ruiz:

Cover sheet:



Book inside:



ANNEX XVI

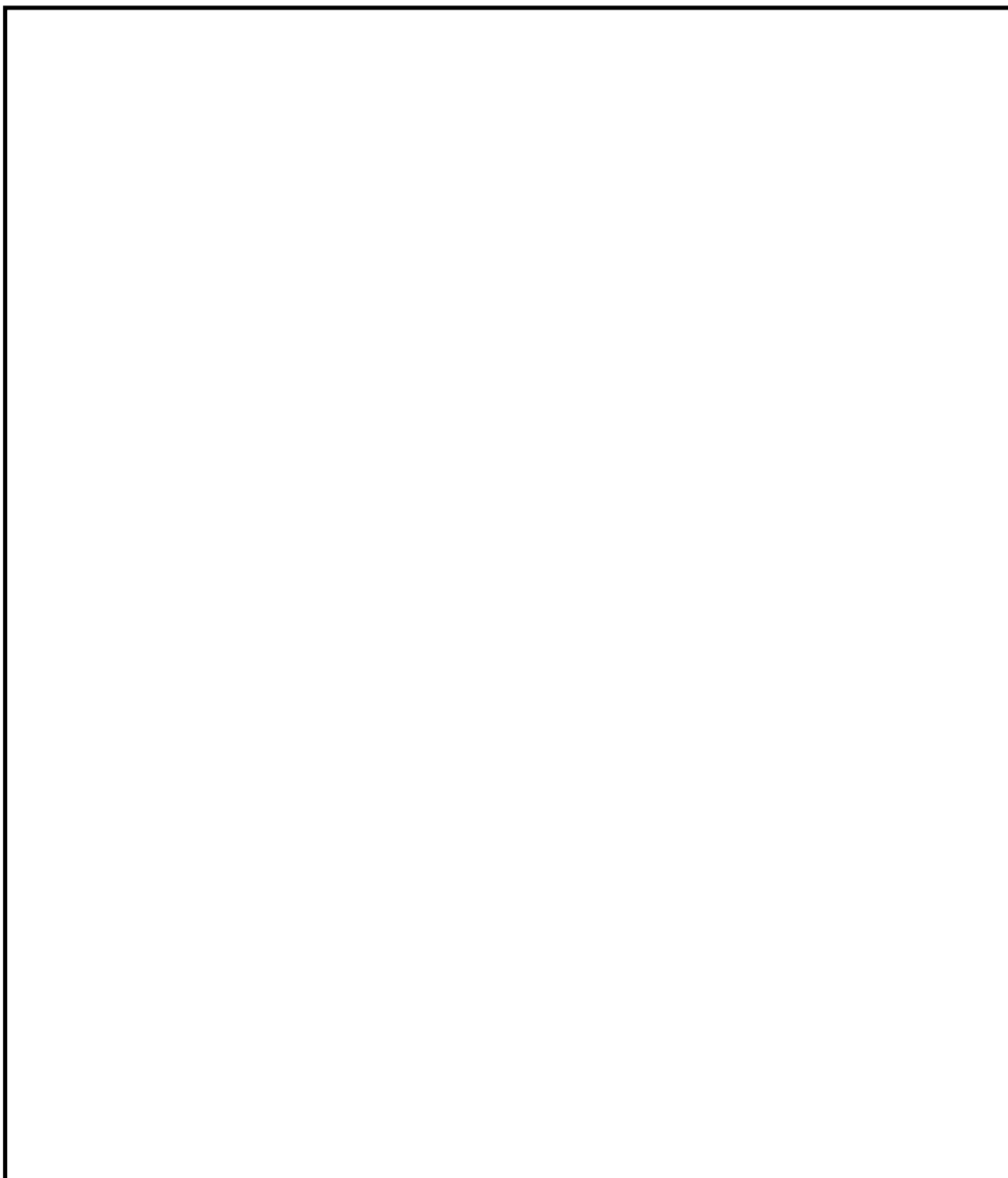
OBSERVATION AND ANECDOTAL SHEET

Pupils name and surname:

Grade:

Subject:

Topic:



ANNEX XVII

CHECKLIST ASSESSMENT

Pupils name and Surname:

Grade:

Subject:

Topic:

Assessment criteria	1 (Excellent)	2 (Very good)	3 Good	4 Unsatisfactory
General				
Identifies, named and writes the parts of the plants.				
Identifies different types of plants: fruit plants and flowering plants.				
Difference and knows the life cycle of a plant.				
Makes observations and conclusions of plants experiments.				
Develops habits of respect and care of plants				

Assessment criteria	1 (Excellent)	2 (Very good)	3 (Good)	4 (Unsatisfactory)
Oral Communication comprehension				
Shows understanding of the listening.				
Recognize plants vocabulary in listening.				
Responds to classroom language.				
Oral communication production				
Answers to questions clearly.				
Participate in speaking activities, sings the song.				
Speaks English in the classroom.				
Use the new vocabulary of plants to speak and communicate.				
Reading and Writing				
Shows understanding of the plants				

command cards and readings.				
Use the new vocabulary about plants in worksheets, writings and portfolio.				
Write short sentences to explain plants observations.				
Sociocultural aspects				
Shows interest in learning.				
Participate in activities.				
Is able to work independently.				
Makes effort to learn.				
Respect other children in the classroom				
Way of working in group.				
Respects and cares plants.				